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AIR WONDER STORIES

JANUARY
1930

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HUGO GERNSBACK
Editor

Science-Aviation Stories
by

ED EARL REPP
A. H. JOHNSON
GEORGE ALLAN ENGLAND

The Man with the "Grasshopper Mind"

"I guess I'll take up Selling"
"Ought to put over that Money-making Idea"
"Think I'll try to make my Evenings worth Something"
"Believe I'll do some Good Reading"
"Some Day I'm going to Start Out for Myself"
"Think I'll change my Job"

YOU know this man as well as you know **YOURSELF**. His mind nibbles at **EVERYTHING** and masters **NOTHING**.

At home in the evening he tunes in the radio—gets tired of it—then glances through a **MAGAZINE**—can't get interested. Finally, unable to **CONCENTRATE** on anything, he either goes to the **MOVIES** or **FALLS ASLEEP** in his chair.

At the **OFFICE** he always takes up the **EASIEST** thing first, puts it down when it gets **HARD**, and starts something else. **JUMPS** from **ONE THING TO ANOTHER** all the time!

There are thousands of these **PEOPLE WITH GRASSHOPPER MINDS** in the world. In fact they are the very people who do the world's **MOST TIRESOME TASKS**—and get but a **PITTANCE** for their work.

They do the world's **CLERICAL WORK**, and routine drudgery. Day after day, week after week, month after month, year after year—**ENDLESSLY**—they **HANG ON** to the jobs that are smallest-salaried, longest-houred, least interesting, and poorest-futured!

If **YOU** have a "grasshopper mind" you know that this is **TRUE**. And you know **WHY** it is true. Even the **BLAZING SUN** can't burn a hole in a little piece of **TISSUE PAPER** unless its rays are focussed and concentrated **ON ONE SPOT**!

A BRAIN THAT BALKS at sticking to **ONE THING FOR MORE THAN A FEW MINUTES** surely cannot be depended upon to get you anywhere in your **YEARS** of life!

The **TRAGEDY** of it all is this: you know that **RIGHT NOW** you are merely jumping **HERE AND THERE**. Yet you also know that you have **WITHIN YOU** the intelligence, the earnestness, and the ability that can take you right to the high place you want to reach in life!

What is **WRONG**? **WHAT'S** holding you back?

Just one fact—one **SCIENTIFIC** fact. That is all. And when you know what it **IS**, then you can easily learn how to apply it; make it carry you **STEADILY, POSITIVELY, AND DIRECTLY** to prosperity and independence.

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TEN per cent of his brain is all the **AVERAGE** person uses. He is paid for **ONE-TENTH** of what he really possesses because that is all he actually **USES**. The remainder lies dormant. The longer it is unused, the harder it becomes to use it. For the mind is like a muscle. It grows in power through exercise and use. It weakens and deteriorates with idleness.

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Table of Contents

January

THE FLYING LEGION
(A Story in Four Parts) (Part 1)
By George Allan England.....582

AIRPORTS FOR WORLD TRAFFIC
By H. Dominik.....610

THE STORM BUSTER
By Ed Earl Repp.....614

THE DEATH'S HEAD METEOR
By Neil R. Jones.....628

THE THUNDERER
By A. H. Johnson.....634

WHAT IS YOUR AVIATION KNOWLEDGE?
Aviation Questionnaire.....609

AVIATION NEWS OF THE MONTH.....651

AVIATION FORUM.....653

THE READER AIRS HIS VIEWS
Letters From Our Readers.....654

On the Cover This Month

is shown "The Thunderer" drying up one of our lakes by decomposing the water into its elements. With his airship held stationary in the air he lets down two electric cables. A spark passing between them decomposes the water.

NEXT MONTH

THE FLYING LEGION, by George Allan England. With the second installment of this masterpiece of aviation science fiction we get into the heart of the story. The recent exploits of Colonel Lindbergh in surveying the Mayan ruins in Central America, have brought vividly before us the possibility of exploring unknown lands through the airplane. Nowhere is this question so dramatically covered than in the coming installments of "The Flying Legion. We are sure that our readers will rank this story with "The Ark of the Covenant," as the greatest of aviation science fiction stories.

THE VANISHING FLEET, by Henrik Dahl Juve. Readers of Mr. Juve's previous stories will be glad to know that his characters, Captain Gauthier and Lt. Evenrude are back with us again. These dauntless aviators of the 26th Century, men who are cool, fearless, and almost emotionless, again engage in a most astounding adventure in the air. Mr. Juve really seems to have struck his stride in this story, and, as usual, he evolves novel and thoroughly convincing scientific instruments with which to carry out his ideas.

THE RED ACE, by Eugene Key. Because of its great extent and its comparative freedom the air is expected to be the harboring place of many of our future criminals. Just as in days gone past, pirates set upon merchant ships of the sea and robbed them of their valuables, so we may expect that with the increase in air traffic, that the pirate of the air will lie in wait for transport planes on which to commit their acts of piracy. In a wonderfully dramatic story, Mr. Key shows us how this is done, and how the forces of law and order go about vanquishing them.

BERLIN TO NEW YORK IN AN HOUR, by Max Valier. Although this title sounds rather fantastic and impossible of fulfillment, yet Mr. Valier, one of the leading German scientists experimenting with the rocket plane, shows convincingly how it can be done. THIS IS NOT A STORY, but it is a cool scientific article, with illustrations, how in the not-too-distant future our present means of transportation by air will seem as antiquated as the horse and buggy does to us now.

AND OTHERS.

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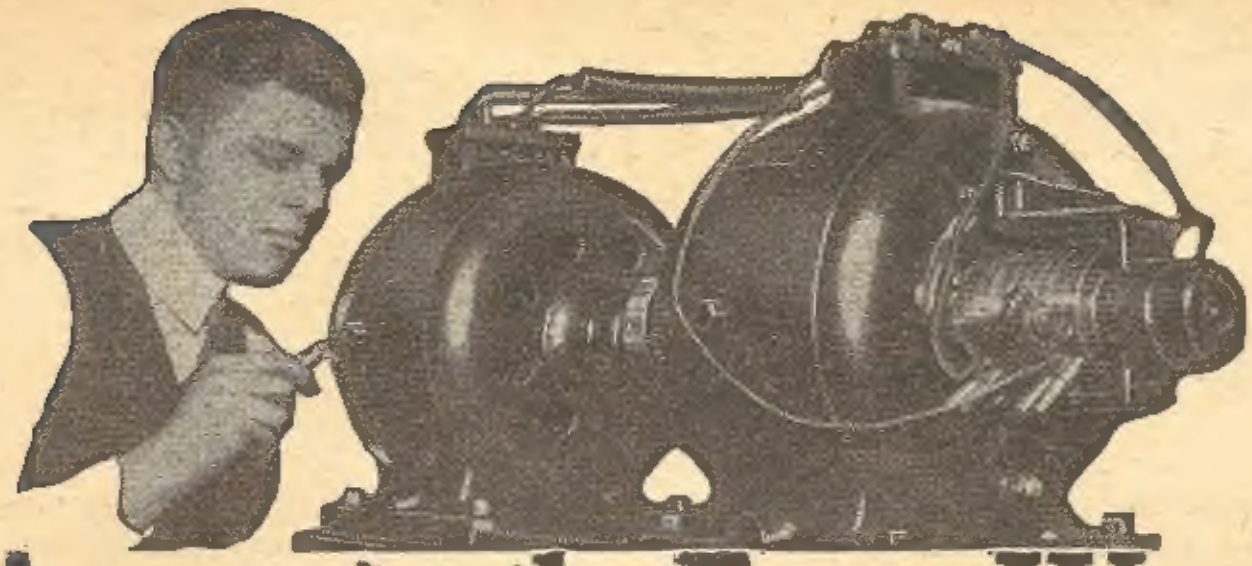

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real batteries . . . winding real armatures, operating real motors, dynamos and generators, wiring houses, etc., etc. That's a glimpse of how we make you a master practical electrician in 90 days, teaching you far more than the average ordinary electrician ever knows and fitting you to step into jobs leading to big pay immediately after graduation. Here, in this world-famous *Parent school*—and nowhere else in the world—can you get this training!

employment bureau gives you a lifetime service. Two weeks after graduation, Clyde F. Hart got a position as electrician for the Great Western Railroad at over $100 a week. That's not unusual. We can point to Coyne men making up to $600 a month. $60 a week is only the beginning of your opportunity. You can go into radio, battery, or automotive electrical business for yourself and make up to $15,000 a year.

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New Book Club Cuts Price of Month's Leading Books to 42c

By ARTHUR K. WHITLEY

NEVER before in the history of book publishing has there been so wide and varied a deluge of important—really significant—books. A recent list of best-sellers includes such names as Julian Green, Susan Ertz, John Galsworthy, Hugh Walpole. There is no doubt that American readers want good literature, and are willing to read any amount of good books—if they are within reach.

But so many books are published each year that it is almost impossible for the average reader to buy every volume he would like to own. As a result, hundreds of worthwhile volumes are overlooked—due to the "high cost of literature."

Why are books so expensive? Why can they not be sold as cheaply as magazines? This has long been the problem of a group of distinguished writers, educators and publishers.

The Writer said: "The author's earnings do not increase the price of good books. He would much prefer having 50,000 readers purchase his book for 42c a copy than only 5,000 at $2.50."

The Educator said: "Free public education has given the average citizen an appreciation of good books. More fine literature is being read today than ever before."

The Publisher said: "If enough buyers can be secured in advance, I can publish important new books, have them artistically designed, durably bound—and sell them for 42c a volume, or 1/6 the present prices."

And so the writer, educator and publisher conferred with printers, artists, distributors—*and worked out their plan.* The result is: *Paper Books.* This is a wonderful new book club that provides one outstanding volume a month—12 important, notable books a year—for the unheard of price of only 42c a volume! The books average 300 pages and contain as many words in as large type as the average $3 or $4 book.

Thousands upon thousands of readers who never dreamed that fine books, beautifully designed and printed could be sold for only 42c a volume, have already become charter members. After subscribers received their first two selections, "The Golden Wind" by Takashi Ohta and Margaret Sperry, a fascinating novel, and "Frederick the Great" by Margaret Goldsmith, a vivid, *full length* biography—letter after letter came to the Editorial Board expressing amazement that such a publishing feat could have been accomplished.

The New York *Times,* writing of the first Paper Book selection says: "Not only is 'The Golden Wind' remarkable for a most unusual and successful blending of East and West in romantic narrative, but its selection marks it as a portent in American publication. With cover and end-papers designed by Rockwell Kent, it is a distinguished piece of work, compounded of good paper, clear type and well bound."

The newest *Paper Book* selection is "Dewer Rides" by L.A.G. Strong. This novel is creating a sensation in England where it has received greater praise from critics than any other novel in recent years. Selections like these more than justify the original plans of this remarkable new book club. Now everyone can enjoy a whole year's distinguished reading—*for less than the price of two books;* and still have sufficient in their book budget to buy other volumes that may interest them.

Some of the men responsible for this wonderful new publishing innovation are: Padraic Colum, famous author, Everett Dean Martin, distinguished educator, Lincoln Colcord, eminent critic, Louis Untermeyer, oustanding American editor, poet and critic, Horace M. Kallen and Charles Boni.

Rockwell Kent, art editor, and Elmer Adler director of printing; are responsible for the beauty and artistry of the volumes.

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VOLUME 1
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AIR WONDER • STORIES

JANUARY
1930

• • • • • • *The Future of Aviation Springs from the Imagination* • • • • • •

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These aeronautical experts pass upon the scientific principles of all stories

ONE THOUSAND MILES AN HOUR

By HUGO GERNSBACK

THE first motored airplane flown by the Wrights travelled at the rate of 10 miles an hour. In the fall of 1929, an English flyer attained a speed of 358 miles an hour, the fastest flight ever made by man.

Persons now living will, no doubt, witness a flight in which a sustained speed of 1,000 miles an hour is made. Thinking persons will realize that this is quite within the bounds of reason.

But, let us see what happens when we fly at 1,000 miles an hour, which is the speed of the earth at the equator as it rotates around its axis, the circumference of the earth being 24,000 miles, roughly. In the latitude of New York, the earth's rotational speed is somewhat less, being only about 760 miles an hour. In higher latitudes, north or south, the speed gradually diminishes further.

Now, then, the atmosphere in which an aviator flies moves with the earth, as though solidly attached to it, just as our oceans do. If this were not the case, we on the surface of the earth would constantly face a hurricane going at the rate of 1,000 miles an hour; but we know that the air moves with the earth, as it rotates on its axis.

Suppose, now, a future Lindbergh were to start flying around the earth in a non-stop flight at the rate of 1,000 miles an hour. If he starts somewhere on the equator, let us say at six o'clock in the morning, and flies due east, he will, naturally, circumnavigate the globe in twenty-four hours—returning to his starting point at the end of that time. But let us see what happens. The speed of the earth going from west to east is 1,000 miles an hour. The aviator in the same direction has not only his own speed of 1,000 miles an hour, but also that of the atmosphere. He thus goes twice as fast as the earth spins; his absolute speed is 48,000 miles in 24 hours.

And this ushers in a most peculiar but interesting phenomenon. During his twenty-four-hour flight, he will see the sun rise twice and set twice. In other words he will live two terrestrial days during the passage of twenty-four hours by his watch. Incredible! But true, as a little reflection will reveal.

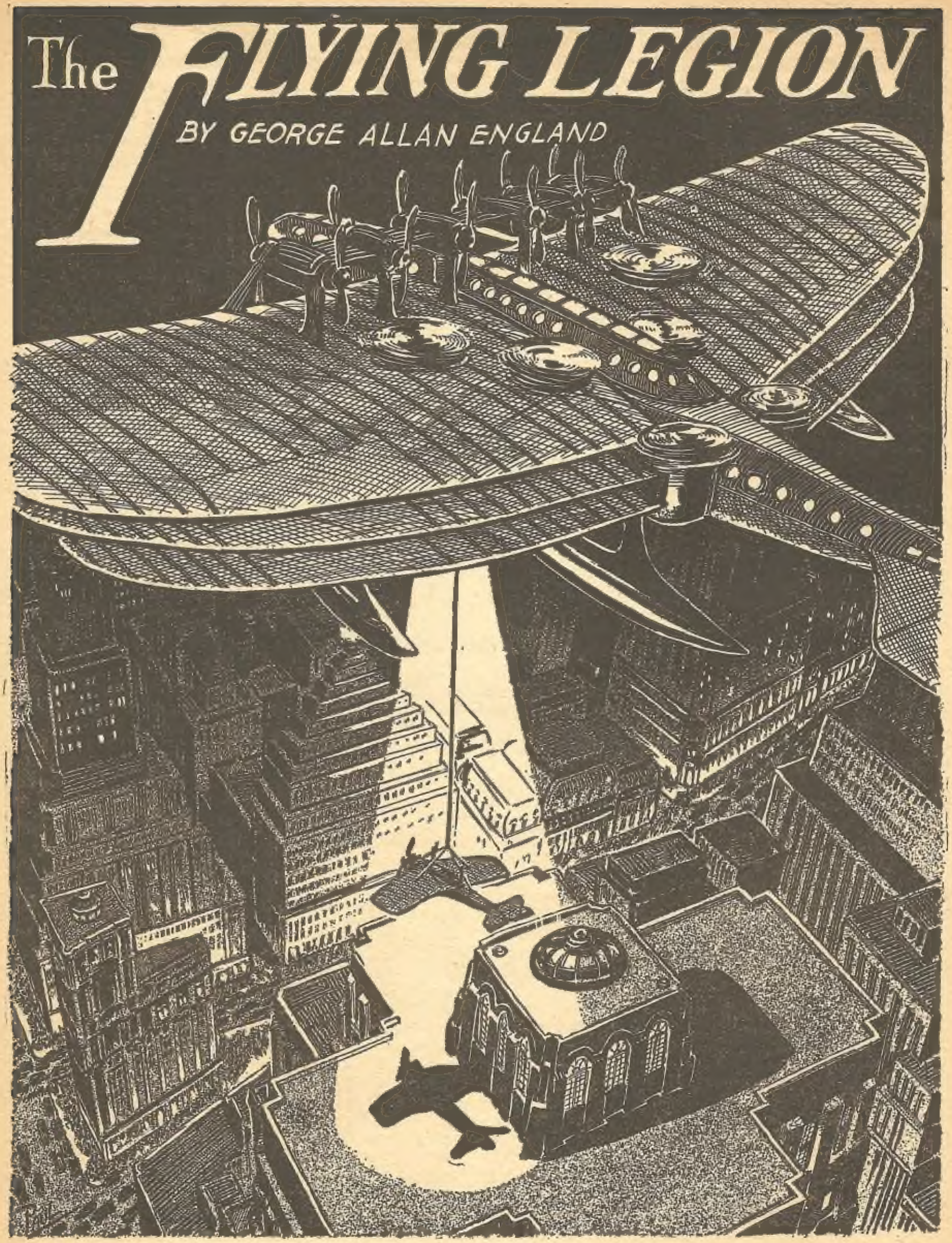
What a thrill all this will give the future Lindbergh! And, incidentally, he will be in the air less time than Lindbergh, in his historic flight from New York to Paris when he took 33½ hours.

But there are still other wonders for the enterprising aviator of the future. Suppose, in his rocket machine, he flies towards the sun, straight up from the earth, let us say, 1,000 or 2,000 miles above sea level. If some means can be found to hover in space, the aviator can now "stand still," with reference to a line between the center of the earth and the sun, with the sun directly over his head; and he will see the earth spin around, and be enabled to view every part of the globe, all within twenty-four hours. It he does not want to wait twenty-four hours, he can, by flying from east to west, see the entire earth in twelve hours instead. That means, of course, that all he will have to do is to fly west with an absolute speed of 1,000 miles an hour, which should be comparatively easy, and then he will see the sun rising in the west! And, if he desired to travel from one point to another, all that he need do is to rise above the atmosphere, wait until his destination comes around underneath him and glide down to it.

Such are the wonders of future aviation.

The FLYING LEGION

BY GEORGE ALLAN ENGLAND



(Illustration by Paul)

With noiseless speed the winch gathered in the cable. Up swooped the plane. As it cleared the roof, *Nistr* purred forward, slid away and gathered speed over the city.

IT happens rarely that a story combines in it great stirring adventures, excellent science, and a fine literary style. This masterpiece of aviation science fiction is one of those stories.

From out of the great war, there emerged hundreds of thousands of young men who had seen the strange places of the world and tasted of adventure, and therefore looked upon our prosaic city life with an air of boredom. It is inevitable that such men should respond to the call of adventure, if that adventure takes them into other mysterious places of the globe, where not only strange happenings await them, but also the possibility of great fortune.

The Master is one of those persons to whom adventure always beckons. A scientific genius, a leader of men, and a fearless soldier, he is sure to command our greatest respect and admiration; and his Plan is so breathtaking in its scope that we may well gasp at the immensity of it.

We are sure that this masterpiece will make an indelible impression on the minds of our readers.

GEORGE ALLAN ENGLAND

THE room was strange as the man, himself, who dwelt there. It seemed, in a way, the outward expression of his inner personality. He had ordered it built from his own plans, to please a whim of his restless mind, on top of the gigantic skyscraper that formed part of his properties. Windows boldly fronted all four cardinal compass-points—huge, plate-glass windows that gave a view unequalled in its sweep and power.

The room seemed an eagle's nest perched on the summit of a man-made crag. The Arabic name that he had given it—*Niss'rosh*—meant just that. Singular place indeed, well-harmonized with its master.

Through the westward windows, umbers and pearls of dying day, smudged across a smoky sky, now shadowed trophy-covered walls. This light, subdued and somber though it was, slowly-fading, verging toward a night of May, disclosed unusual furnishings. It showed a heavy black table of some rare Oriental wood elaborately carved and inlaid with still rarer woods; a table covered with a prayer-rug, on which lay various books on aeronautics and kindred sciences, jostling works on Eastern travel, on theosophy, mysticism, exploration.

Maps and atlases added their note of research. At one end of the table stood a bronze faun's head with open lips, with hand cupped at listening ear. Surely that head must have come from some buried art-find of the very long ago. The faint greenish patina that covered it could have been painted only by the hand of the greatest artist of them all, Time.

A book-case occupied the northern space, between the windows. It, too, was crammed with scientific reports, oddments of out-of-the-way lore, and travels. But here a profusion of war-books and official documents showed another bent of the owner's mind. Over the book-case hung two German gas-masks. They seemed, in the half-dusk, to glower down through their round, empty eye-holes like sinister devil-fish awaiting prey.

The masks were flanked by rifles, bayonets, knives, maces, all bearing scars of battle. Above them, three fragments of Prussian battle-flags formed a kind of frieze, their color softened by the fading sunset, even as the fading of the dream of imperial glory had dulled and dimmed that for which they had stood.

The southern wall of that strange room—that quiet room to which only a far, vague murmur of the city's life whispered up, with faint blurs of steamer-whistles from the river—bore Turkish spoils of battle. Here hung more rifles, there a Kurdish yataghan with two hand-grenades from Gallipoli, and a blood-red banner with a crescent and one star worked in gold thread. Aviator's gauntlets draped the staff of the banner.

Along the eastern side of this eyrie a broad divan invited one to rest. Over it were suspended Austrian and Bulgarian captures—a lance with a blood-stiffened pennant, a cuirass, entrenching-tools, a steel helmet with an eloquent bullet-hole through the crown. Some few framed portraits of noted "aces" hung here and elsewhere, with two or three photographs of battle-planes. Three of the portraits were framed in symbolic black. Part of a smashed Taube propeller hung near.

As for the western side of *Niss'rosh*, the space between the two broad windows that looked out over the light-spangled city, the Hudson and the Palisades was occupied by a magnificent Mercator's Projection of the World. This projection was heavily annotated with scores of comments pencilled by a firm, virile hand. Lesser spaces were occupied by maps of the campaigns in Mesopotamia and the Holy Land. One map, larger than any save the Mercator, showed the Arabian Peninsula. A bold question-mark had been impatiently flung into the great, blank stretch of the interior; a question-mark eager, impatient, challenging.

It was at this map that the Master of *Niss'rosh*, the eagle's nest, was peering as the curtain rises on our story. He was half-reclining in a big, Chinese bamboo chair, with an attitude of utter and disheartening boredom. His crossed legs were stretched out, one heel digging into the soft pile of the Tabreez rug. Muscular arms folded in an idleness that irked them with aching weariness, he sat there, brooding, motionless.

The Master Decides

EVERYTHING about the man spelled energy at bay, forces rusting, ennui past telling. But force still dominated. Force showed in the close-cropped, black hair and the small ears set close to the head; in the corded throat and heavy jaws; in the well-muscled shoulders, sinewed hands, powerful legs. This man

was forty-one years old, and looked thirty-five. Lines of chest and waist were those of the athlete. Still, suspicions of fat, of unwonted softness, had begun to invade those lines. Here was a splendid body, here was a dominating mind in process of going stale.

The face of the man was a mask of weariness of the soul, which kills so much more efficiently than weariness of the body. You could see that weariness in the tired frown of the black brows, the narrowing of the dark eyes, the downward tug of the lips. Wrinkles of stagnation had begun to creep into forehead and cheeks—wrinkles that no amount of gymnasium, of club-life, of careful shaving, of strict hygiene could banish.

Through the west windows the slowly-changing hues of gray, of mulberry and dull rose-pink blurred in the sky, cast softened lights upon those wrinkles, but could not hide them. They revealed sad emptiness of purpose. This man was tired unto death, if ever man were tired.

He yawned, sighed deeply, stretched out his hand and took up a bit of a model mechanism from the table, where it had lain with other fragments of apparatus. For a moment he peered at it; then he tossed it back again, and yawned a second time.

"Business!" he growled. "'Swapped my reputation for a song,' eh? Where's my commission, now?"

He got up, clasped his hands behind him, and walked a few times up and down the heavy rug, his footfalls silent.

"The business could have gone on without me!" he added, bitterly. "And, after all, what's any business, compared to *life?*"

He yawned again, stretched up his arms, groaned and laughed with mockery:

"A little more money, maybe, when I don't know what to do with what I've got already? A few more figures on a check-book—and the heart dying in me!"

Then he relapsed into silence. Head down, hands thrust deep in pockets, he paced like a captured animal in bars. The bitterness of his spirit was wormwood. What meant, to him, the interests and pleasures of other men? Profit and loss, alcohol, tobacco, women—all alike bore him no message. Clubs, athletics, gambling—he grumbled something savage as his thoughts turned to such trivialities. And into his aquiline face came something the look of an eagle, there in that eagle's nest of his.

Suddenly the Master of *Niss'rosh* came to a decision. He returned, clapped his hands thrice, sharply, and waited. Almost at once a door opened at the southeast corner of the room—where the observatory connected with the stairway leading down to the Master's apartment on the top floor of the building—and a vague figure of a man appeared there.

The light was steadily fading, so that this man could by no means be clearly distinguished. But one could see that he wore clothing quite as conventional as his master's. Still, no more than the Master did he appear one of life's commonplaces. Lean, brown, dry, with a hawk-nose and glinting eyes, surely he had come from far, strange places.

"Rrisa!" the Master spoke sharply, flinging the man's name at him with the exasperation of over-tensed nerves.

"M'almé" (Master?) replied the other.

"Bring the evening food and drink," commanded the Master, in excellent Arabic, guttural and elusive with strange hiatuses of breath.

Rrisa withdraw, salaaming. His master turned toward the western windows. There the white blankness of the map of Arabia seemed mocking him. The Master's eyes grew hard; he raised his fist against the map, and smote it hard. Then once more he fell to pacing; and as he walked that weary space, up and down, he muttered to himself with words we cannot understand.

After a certain time, Rrisa came silently back, sliding into the soft dusk of that room almost like a wraith. He bore a silver tray with a hook-nosed coffee-pot of chased metal. The cover of this coffee-pot rose into a tall, minaret-like spike. On the tray stood also a small cup having no handle; a dish of dates; a few wafers made of the Arabian cereal called *temmin;* and a little bowl of *khat* leaves.

Rrisa placed the tray on the table at his master's side, and was about to withdraw when the other stayed him with raised hand.

"Tell me, Rrisa," he commanded, still speaking in Arabic, "where wert thou born? Show thou me, on that map."

The Arab hesitated a moment, squinting by the dim light that now had faded to purple dusk. Then he advanced a thin forefinger, and laid it on a spot that might have indicated perhaps three hundred miles southeast of Mecca. No name was written on the map, there.

"How dost thou name that place, Rrisa?" demanded the Master.

"I cannot say, *M'almé,*" answered the Arab, very gravely. As he stood there facing the western afterglow, the profound impassivity of his expression—a look that seemed to scorn all this infidel civilization of an upstart race—grew deeper.

The Mysterious City

TO nothing of it all did he owe allegiance, save to the Master himself—the Master who had saved him in the thick of the Gallipoli inferno. Captured by the Turks there, certain death had awaited him and shameful death, as a rebel against the Sublime Porte. The Master had rescued him, and taken thereby a scar that would go with him to the grave; but that, now, does not concern our tale. Only we say again that Rrisa's life lay always in the hands of this man, to do with as he would.

None the less, Rrisa answered the question with a mere:

"M'almé, I cannot say."

"Thou knowest the name of the place where thou wast born?" demanded the Master, calmly, from where he sat by the table.

"A, (yes) *M'almé,* by the beard of M'hámed, I do!"

"Well, what is it?"

Rrisa shrugged his thin shoulders.

"A tent, a hut? A village, a town, a city?"

"A city, *M'almé.* A great city, indeed. But its name I may not tell you."

"The map, here, shows nothing, Rrisa. And of a surety, the makers of maps do not lie," the Master commented, and turned a little to pour the thick coffee. Its perfume rose with grateful fragrance on the air.

The Master sipped the black, thick nectar, and smiled oddly. For a moment he regarded his unwilling orderly with narrowed eyes.

"Thou wilt not say they lie, son of Islam, eh?" demanded he.

"Not of choice, perhaps, *M'almé,*" the Musselman replied. "But if the camel hath not drunk of the waters of the oasis, how can he know that they be sweet? These *Nasara* (Christian) makers of maps, what can

they know of my people or my land?"

"Dost thou mean to tell me no man can pass beyond the desert rim, and enter the middle parts of Arabia?"

"I said not so, *M'almé,*" replied the Arab, turning and facing his master, every sense alert, on guard against any admissions that might betray the secret he, like all his people, was sworn to keep by oath.

"Not all men, true," the Master resumed. "The Turks—I know they enter, though hated. But have no other foreign men ever seen the interior?"

"*A, M'almé,* many—of the True Faith. Such, though they come from China, India, or the farther islands of the Indian Ocean, may enter freely."

"Of course. But I am speaking now of men of the *Nasara* faith. How of them? Tell me, thou!"

"You are of the *Nasara, M'almé!* Do not make me answer this! You, having saved my life, own that life. It is yours. *Ana bermit illi bedakea!* (I obey your every command.) But do not ask me this! My head is at your feet. But let us speak of other things, *O M'almé!*"

The Master kept a moment's silence. He peered contemplatively at the dark silhouette of the Arab, motionless, impassive in the dusk. Then he frowned a very little which was as near to anger as he ever verged. Thoughtfully he ate a couple of the little temmin wafers and a few dates. Rrisa waited in silent patience.

All at once the Master spoke.

"It is my will that thou speak to me and declare this thing, Rrisa," said he, decisively. "Say, thou, has no man of the *Nasara* ever penetrated as far as to the place of thy birth?"

"*Lah,* (no) *M'almé,* never. But three did reach an oasis not far to westward of it, forty years ago, or maybe forty-one."

"Ah, so?" exclaimed the Master, a touch of eagerness in his grave, impassive voice. "Who were they?"

"Two of the French blood, *M'almé,* and one of the Russian."

"And what happened to them, then?"

"They—died, *M'almé.*"

"Thou dost mean, thy people did slay them?"

"They died, all three," repeated Rrisa, in even tones. "The jackals devoured them and the bones remained. Those bones, I think, are still there. In our dry country—bones remain, long."

"Hm! Yea, so it is! But, tell me, thou, is it true that in thy country the folk slay all *Nasara* they lay hands on, by cutting with a sharp knife? Cutting the stomach, so?" He made an illustrative gesture.

"Since you do force me to speak, against my will, *M'almé*—you being of the *Nasara* blood—I will declare the truth. Yes, that is so."

"A pleasant custom, surely! And why always in the stomach? Why do they never stab or cut like other races?"

"There are no bones in the stomach, to dull the edges of the knives, *M'almé.*"

"Quite practical, that idea!" the Master exclaimed. Then he fell silent again. He pressed his questions no further, concerning the great central desert of the land. To have done so, he knew, would have been entirely futile. Beyond a certain point, which he could accurately gauge, neither gold nor fire would drive Rrisa. The Arab would at any hour of night or day have laid down his life for the Master; but though it should mean death he would not break the rites of his faith, nor touch the curséd flesh of a pig, nor drink the forbidden drop of wine, nor yet betray the secret of his land.

"Your God is not my God, *M'almé,*" said he, impersonally, "No, the God of your people is not the God of mine. We have our own; and the land is ours, too. None of the *Nasara* may come thither, and live. Three came, that I have heard of, and—they died. I crave my master's bidding to depart."

All at once the Arab spoke, in slow, grave tones.

"Presently, yes," the Master answered. "But I have one more question for thee. If I were to take thee, and go to thy land, but were not to ask thy help there—if I were not to ask thee to guide me nor yet to betray any secret—wouldst thou play the traitor to me, and deliver me up to thy people?"

"My head is at your feet, *M'almé.* So long as you did not ask me to do such things as would be unlawful in the eyes of Allah and the Prophet, and seek to force me to them, this hand of mine would wither before it would be raised against the preserver of my life! I pray you, *M'almé,* let me depart!"

"I grant it. *Ru'c'h halla!* (Go now)" exclaimed the master, with a wave of the hand. Rrisa salaamed again, and, noiseless as a wraith, vanished.

CHAPTER II

"What if it Could Be"

FOR a time the Master sat in the thickening gloom, eating the dates and temmin wafers, drinking the coffee, pondering in deep silence. When the simple meal was ended, he plucked a little sprig of leaves from the *khat* plant in the bowl, and thrust them into his mouth.

This *khat,* gathered in the mountains back of Hodeida, on the Red Sea not far from Bab-el-Mandeb, had been preserved by a process known to only a few Coast Arabs. The plant now in the bowl was part of a shipment that had been more than three months on the way; yet still the fresh aroma of it, as the Master crushed the thick-set, dark-green leaves, scented the darkening room with perfumes of Araby.

Slowly, with the contemplative appreciation of the connoisseur, the Master absorbed the flavor and the wondrous stimulation of the "Flower of Paradise." The use of khat, his once-a-day joy and comfort, he had learned more than fifteen years before, on one of his exploring tours in Yemen. He could hardly remember just when and where he had first come to know the extraordinary mental and physical stimulus of this strange plant, dear to all Arabs, any more than he definitely recalled having learned the complex, poetical language of that Oriental land of mystery. Both language and the use of khat had come to him from contact with only the fringes of the country; and both had contributed to his vast, unsatisfied longing to know what lay beyond the forbidden zones that walled this land away from all the world.

Wherever he had gone, whatever perils, hardships and adventures had been his in many years of wandering up and down the world, *khat,* the wondrous, had always gone with him. The fortune he had spent on keeping up the supply had many times over been repaid to him in strength and comfort.

The use of this plant, containing obscure alkaloids of the katinacetate class, constituted his only vice—if you can call vice a habit such as this, that works great well-being and that leaves no appreciable aftermaths of evil such as are produced by alcohol or drugs.

For a few minutes the Master sat quite motionless, pondering. Then suddenly he got up again, and strode

to one of the westward-looking windows. The light was almost wholly gone, now. The man's figure, big-shouldered, compact, well-knit, appeared only as a dim silhouette against the faded blur in the west; a blur smoky and streaked with dull smudges as of old, dried blood.

Far below, stretching away, away, shimmered the city's million inconsequential lights. Above, stars were peeping out, were spying down at all this feverish mystery of human life. Some of the low-hung stars seemed to blend with the far lights along the Palisades. The Master's lips tightened with impatience, with longing.

"There's where it is," he muttered. "Not five miles from here! It's there, and I've got to have it. There—a thing that can't be bought! There—a thing that must be mine!"

Among the stars, cutting down diagonally from the northwest, crept a tiny, red light. The Master looked very grim, as his eyes followed its swift flight.

"The Chicago mail-plane, just getting in," he commented. "In half an hour, the Paris plane starts from the Cortlandt Street aero-tower. And beyond Paris lies Constantinople; and beyond that, Arabia—the East! Men are going out that way, tonight! And I—stick here like an old, done relic, cooped in *Niss'rosh*—imprisoned in this steel and glass cage of my own making!"

Suddenly he wheeled, flung himself into the big chair by the table and dragged the faun's head over to him. He pressed a button at the base of it, waited a moment and as the question came, "Number, please?" spoke the desired number into the cupped hand and ear of the bronze. Then, as he waited again, with the singular telephone in hand, he growled savagely:

"By Allah! This sort of thing's not going to go on any longer! Not if I die, stopping it!"

A familiar voice, issuing from the lips of the faun—a voice made natural and audible as the living tones, by means of a delicate telephone attachment inside the bronze head—tautened his nerves.

"Hello, hello?" called he. "That you, Bohannan?"

"Yes," sounded the answer. "Of course I know who *you* are. There's only one voice like yours, in New York. Where are you?"

"In prison."

"No! Prison? For the Lord's sake!"

"No; for conventionality's sake. Not legally, you understand. Not even an adventure as exciting as that has happened to me. But constructively in jail. *De facto*, as it were. It's all the same thing."

"Up there in that observatory thing of yours, are you?" asked Bohannan.

"Yes; and I want to see you."

"When?"

"At once! As soon as you can get over here in a taxi, from that incredibly stupid club of yours. You can get to *Niss'rosh* even though it's after seven. Take the regular elevator to the forty-first floor, and I'll have Rrisa meet you and bring you up here in the special.

"That's a concession, isn't it? The sealed gates that no one else ever passes, at night, are opened to you. It's very important. Be here in fifteen minutes you say? First-rate! Don't fail me. Good-by!"

He was smiling a little, now, as he pressed the button again and rang off. He put the faun's head back on the table, got up and stretched his vigorous arms.

"By Allah!" he exclaimed, new notes in his voice. "What if—what if it *could* be, after all?"

He turned to the wall, laid his hand on an ivory plate flush with the surface and pressed slightly. In silent unison, heavy gold-embroidered draperies slid across every window. As these draperies closed the apertures, light gushed from every sconce and cornice. No specific source of illumination seemed visible; but the room bathed itself in soft, clear radiance with a certain restful greenish tinge, throwing no shadows, pure as the day itself.

Bohannan

THE man pulled open a drawer in the table, and silently gazed down at several little boxes, within. He opened some. From one, on a bed of purple satin, the Croix de Guerre with a palm gleamed up at him. Another disclosed an "M.M.," a Médaille Militaire. A third showed him the "D.F.C.," or Distinguished Flying Cross. Still another contained aviators' insignia in the form of a double pair of wings. The Master smiled, and closed the boxes, then the drawer.

"After these," he whispered, "dead inaction? Not for me!"

His dark eyes were shining with eagerness as he walked to a door beside that through which the Arab had entered. He swung it wide, disclosing an ample closet, likewise inundated with light. There hung a war-worn aviator's uniform of leather, gauntlets, a sheepskin jacket, a helmet, resistal goggles, a cartridge-belt still half full of ammunition, a heavy service automatic.

For a moment the man peered in at these. A great yearning came upon his face. Caressingly he touched the uniform, the helmet. He unhooked the pistol from where it hung, and carried it back to the table.

There he laid it down, and drew up his chair in front of it. For a moment, silence fell as he remained there studying the automatic—silence save for the faint, far hum of the city, the occasional melodious note of steamer-whistles on the river.

The Master's face, now that full light brought out its details, showed a white scar that led from his right ear down along jaw and throat, till the collar masked it. Gray hairs, beyond those of his age, sprinkled his temples. Strangely, he smiled as he observed the nicks and deep excoriations in stock and barrel of the formidable weapon. He reached out, took up the gun once more, weighed it, got the feel of it, patted it with affection.

"We've been through some wonderful times together, old pal, you and I," said he. "We thought it was all over, didn't we, for a while? But it's not! Life's not done, yet. It's maybe just beginning! We're going out on the long trek, again!"

For a while he sat there musing. Then he summoned Rrisa again, bade him remove the tray, and gave him instructions about the guest soon to arrive. When Rrisa had withdrawn, the Master drew over one of the huge atlases, opened it, turned to the map of Arabia, and fell into deep study.

Rrisa's tapping at the door, minutes later, roused him. At his order to advance, the door swung. The Arab ushered in a guest, then silently disappeared. Without a sound, the door closed.

The Master arose, advancing with outstretched hand.

"Bohannan! God, but I'm glad to see you!"

Their hands met and clasped. The Master led Bohannan to the table and gestured toward a chair. Bohannan threw his hat on the table with a large, sweeping gesture typical of his whole character, and sat down. And for a moment, they looked at each other in silence.

A very different type, this, from the dark, sinewed master of *Niss'rosh*. Bohannan was frankly red-haired, a bit stout, smiling, expansive. His blood was undoubt-

edly Celtic. An air of great geniality pervaded him. His hands were strong and energetic; with oddly spatulate fingers; and the manner in which his nails had been gnawed down and his mustache likewise chewed, bespoke a highly nervous temperament belied by his ruddy, almost boyish face. His age might have been thirty-five, but he looked one of those men who never fully grow up, who never can be old.

"Well, what's doing now?" demanded he, fixing blue eyes on his host. He produced a cigarette and lighted it, inhaled smoke deeply and blew a thin gray cloud toward the ceiling. "Something big, eh? by the way you routed me out of a poker-game where I was already forty-seven dollars and a half to the good. You don't usually call a fellow, that way, unless there's something in the wind!"

"There is, now."

"Big?"

"Very."

"So?" The new-comer's eyes fell on the pistol. "Yes, that looks like action, all right. Hope to heaven it *is!* I've been boring myself and everybody else to death, the past three months. What's up? Duel, maybe?"

"Yes. That's just it, Bohannan. A duel." And the Master fixed strange eyes on his companion. His muscular fingers fell to tapping the prayer-rug on the table, drumming out an impatient little tattoo.

"Duel? Lord's sake, man! With whom?"

"With Fate. Now, listen!" The Master's tones became more animated. A little of the inward fires had begun to burn through his self-restraint. "Listen to me, and not a word till I'm done! You're dry-rotting for life, man. Dying for it, gasping for it, eating your heart out for it! So am I. So are twenty-five or thirty men we know, between us, in this city. That's all true, eh?"

"Some!"

"Yes! We wouldn't have to go outside New York to find at least twenty-five or thirty in the same box we're in. All men who've been through trench-work, air-work, life and death work on various fronts. Men of independent means. Men to whom office work and club life and all this petty stuff, here is like dish-water after champagne! Daredevils, all of them, that wouldn't stop at the gates of hell!"

"The gates of hell!" demanded Bohannan, his brow wrinkling with glad astonishment. "What d'you mean by that, now?"

"Just what I say! It's possible to gather together a kind of unofficial, sub-rosa, private little Foreign Legion of our men, Bohannan—all battle-scarred men, all men with at least one decoration and some with half a dozen. With that Legion, nothing would be impossible!"

He warmed to his subject, leaned forward, fixed eager eyes on his friend, laid a hand on Bohannan's knee. "We've all done the conventional thing, long enough. Now we're going to do the unconventional thing. We've been all through the known. Now we're going after the unknown. And Hell is liable to be no name for it, I tell you that!"

The Celt's eyes were alight with swift, eager enthusiasm. He laid his hand on the other's, and gripped it hard.

"Tell me more!" he commanded. "What are we going to do?"

"Going to see the stuff that's in us, and in twenty-five or thirty more of our kind. The stuff, the backbone, the heart that's in you, Bohannan! That's in me! In all of us!"

"Great, great! That's me!" Bohannan's cigarette smouldered, unheeded, in his fingers. The soul of him was thrilling with great visions. "I'm with you! Whither bound?"

The Master smiled oddly, as he answered in a low, even tone:

"To Paradise—or Hell!"

CHAPTER III

The Gathering of the Legionaries

ONE week from that night, twenty-seven other men assembled in the strange eyrie of *Niss'rosh*, nearly a thousand feet above the city's turmoil. They came singly or in pairs, their arrival spaced in such a manner as not to make the gathering obvious to any one in the building below.

Rrisa, the silent and discreet, brought them up in the private elevator from the forty-first floor to the Master's apartment on the top story of the building, then up the stairway to the observatory, and thus ushered them into the presence of the Master and Bohannan. Each man was personally known to one or the other, who vouched absolutely for his secrecy, valor and good faith.

This story would resolve itself into a catalogue were each man to be named, with his title, his war-exploits, his decorations. We shall have to touch but lightly on this matter of personnel. Six of the men were Americans—eight, including the Master and Bohannan; four English; five French; two Serbian; three Italian; and the others represented New Zealand, Canada, Russia, Cuba, Poland, Montenegro and Japan.

Not one of these men but bore a wound or more, from the Great Conflict. This matter of having a scar had been made one prime requisite for admission to the Legion. Each had anywhere from one to half a dozen decorations, whether the Congressional Medal, the V. C., the Croix de Guerre, the Order of the Rising Sun, or what-not.

None were in uniform. That would have made their arrival far too conspicuous. Dressed as they were, in mufti, even had anyone noted their coming, it could not have been interpreted as anything but an ordinary social affair

Twenty-nine men, all told, gathered in the observatory, clearly-illumnated by the hidden lights. All were true blue, all loyal to the core, all rusting with ennui, all drawn thither by the lure of the word that had been passed them in club and office, on the golf-links, in the street. All had been pledged, whether they went further or not, to keep this matter secret as the grave.

Some were already known to each other. Some needed introduction. Such introduction consumed a few minutes, even after the last had come and been checked off on the master's list, in cipher-code. The brightly-lighted room, behind its impenetrable curtains, blued with tobacco-smoke; but no drop of wine or spirits was visible.

The Master, at the head of the table, sat with his list and took account of the gathering. Each man, as his name was called, gave that name in full, briefly stated his service and mentioned his wound.

All spoke English, though some rather mangled it. At any rate, this was to be the official language of the expedition, and no other was to be allowed. The ability to understand and obey orders given in English had, of course, to be one essential requisite for this adventurous band of Legionaries.

When the credentials had all been proved satisfactory, the Master rapped for order. Silence fell. The man settled down to listen, in tense expectancy. Some took chairs, others occupied the divan, still others—for whom there were no seats—stood along the walls.

Informal though the meeting still was, an air of military restraint and discipline already half-possessed it. The bright air seemed to quiver with the eagerness of these fighting men once more to thrust out into the currents of activity, to feel the tightening of authority, the lure and tang of the unknown.

Facing them from the end of the table, the Master stood and spoke to them, with Bohannan seated at his right. His face reflected quite another humor from that of the night, a week before, when first this inspiration had come upon him.

He seemed refreshed, buoyant, rejuvenated. His eyes showed fire. His brows, that had frowned, now had smoothed themselves. His lips smiled, though gravely. His color had deepened. His whole personality, that had been sad and tired, now had become inspired with a profound and soul-felt happiness.

"Gentlemen all, soldiers and good men," said he, slowly. "In a general way you know the purpose of this meeting. I am not given to oratory. I do not intend making any speech to you.

"We are all ex-fighters. Life, once filled with daring and adventure, has become stale, flat and unprofitable. The dull routine of business and of social life is Dead Sea fruit to our lips—dust and ashes. It cannot hold or entertain us.

"By this I do not mean that war is good, or peace bad. For the vast majority of men, peace is normal and right. But there must be always a small minority that cannot tolerate *ennui;* that must seek risks and daring exploits; that would rather lay down their lives, to-day, in some man-sized exploit, than live twenty-five years longer in the dull security of a humdrum rut.

"Such men have always existed and probably always will. We are all, I believe, of that type. Therefore you will all understand me. I will understand you. And each of you will understand the rest.

"Major Bohannan and I have chosen you and have invited you here because we believe every man in this room is precisely the kind of man I have been defining. We believe you are like ourselves, dying of boredom, eager for adventure. And willing to undergo military discipline, swear secrecy, pledge honor and risk life itself, provided the adventure be daring enough, the reward promising enough. If there is anyone here present who is unwilling to subscribe to what I have said, so far, let him withdraw."

No one stirred. But a murmur arose, eager, delighted:

"Go on! Go on—tell us more!"

"Absolute obedience to me is to be the first rule," continued the Master "The second is to be sobriety. There shall be no drinking, carousing or gambling. This is not to be a vulgar, swashbuckling, privateering revel, but—"

The Stranger

A SLIGHT disturbance at the door interrupted him. He frowned, and rapped on the table, for silence. The disturbance, however, continued. Someone was trying to enter, there, against Rrisa's protests.

"I did not bring you up, sir," the Arab was saying, in broken English. You cannot enter! How did you come here?"

"I'm not in the habit of giving explanations to subordinates, or of bandying words with them," replied the man, in a clear, rather high-pitched but very determined voice. The company, peering at him, saw a slight, well-knit figure of middle height or a little less, in aviator's togs. "I'm here to see your Master, my good fellow, not you!"

The man at the head of the table raised a finger to his lips, in signal of silence from them all, and beckoned the Arab.

"Let him come in!" he ordered, in Rrisa's vernacular.

"A, M'almé!" submitted the desert man, standing aside and bowing as the stranger entered. The master added, in English:

"If he comes as a friend and helper, uninvited though he be, we welcome him. If as an enemy, traitor, or spy, we can deal with him. Sir, advance!"

The stranger came to the foot of the table. Men made way for him. He stood there a moment in silence, dropped his gauntlets on the table and seemed peering at the Master. Then all at once he drew himself up, sharply, and saluted.

The Master returned the salute. A moment's silence followed. No man was looking elsewhere than at this interloper.

Not much could be seen of him, so swaddled was he in sheepskin jacket, aviator's helmet and goggles. Leather trousers and leggins completed his costume. The collar of the jacket, turned up, met the helmet. Of his face, only the chin and lower part of the cheeks remained visible.

The silence tautened, stretched to the breaking point. All at once the Master of *Niss'rosh* demanded, incisively:

"Your name, sir?"

"Captain Alfred Alden, of the R. A. F."

"Royal Air Force man, eh? Are you prepared to prove that?"

"I am."

"If you're not, well—this won't be exactly a salubrious altitude for you."

"I have my papers, my licenses, my commission."

"With you, here?"

"Yes, sir."

"Very well," answered the Master, "I will examine them in due time English, American, or—?"

"I am a Canadian," answered the aviator. "I have seen nearly two years' active service. I rank as an ace. I bear three wounds and have been cited several times. I have the Distinguished Service Cross. What more need I tell you, sir?"

His voice was steady and rang true. The Master nodded approval, that seemed to echo round the room in a buzz of acceptance. But there were still other questions to be asked. The next one was:

"How did you come here? It's obvious my man didn't bring you up."

"I came in my own plane, sir," the stranger answered, in a dead hush of stillness. "It just now landed on the roof of this building. If you will draw the curtains, there behind you, I believe you can see it for yourself."

"I heard no engine."

"I volplaned in. I don't say this to boast sir, but I can handle the average plane as accurately as most men handle their own fingers."

"Were you invited to attend this meeting by either Major Bohannan or by me?"

"No, sir, I was not."

"Then, why are you here?"

"Why am I here? For exactly the same reason that all the rest are here, sir!" The aviator swept his arm comprehensively at the ranks of eagerly listening men. "To resume active service. To get back to duty. To live, again! In short, to join this expedition and to share all its adventures!"

"Hm! Either that, or to interfere with us."

"Not the latter, sir! I swear that!"

"How did you know there was going to be an expedition, at all?" demanded the Master, his brows tensed, lips hard, eyes very keen. The aviator seemed smiling, as he answered:

"I know many things. Some may be useful to you all. I am offering you my skill and knowledge, such as they may be, without any thought or hope of reward."

"Why?"

"Because I am tired of life. Because I want—must have—the freedom of the open roads, the inspiration of some great adventure! Surely, you understand."

"Yes, if what you say is true, and you are not a spy. Show us your face, sir!"

The aviator loosened his helmet and removed it, disclosing a mass of dark hair, a well-shaped head and a vigorous neck. Then he took off his goggles.

A kind of communal whisper of astonishment and hostility ran round the apartment. The man's whole face—save for eye-holes through which dark pupils looked strangely out—was covered by a close-fitting, flesh-colored celluloid mask.

This mask reached from the roots of his hair to his mouth. It sloped down the left jaw, and somewhat up the cheekbone of the right side. The mask was firmly strapped in place around the head and neck.

"What does all this mean, sir?" demanded the Master, sharply. "Why the mask?"

"Is that a necessary question, sir?" replied the aviator, while a buzz of curiosity and suspicion rose. "You have seen many such during the war and since its close."

"Badly disfigured, are you?"

"That word, 'disfigured,' does not describe it, sir. Others have wounds, but my whole face is nothing but a wound. No, let me put it more accurately—there is, practically speaking, no face at all. The gaping cavity that exists under this mask would certainly sicken the strongest man among you, and turn you against me.

"We can't tolerate what disgusts, even if its qualities be excellent. In exposing myself to you, sir, I should certainly be insuring my rejection. But what you cannot see, what you can only imagine, will not make you refuse me."

The Master pondered a moment, then nodded and asked:

"Is it so very bad, sir?"

"It's a thing of horror, incredible, awful, unreal! In the hospital at Rouen, they called me 'The Kaiser's Masterpiece.' Some of the most hardened surgeons couldn't look at me, or dress my—wound, let us call it—without a shudder. Ordinary men would find me intolerable, if they could see me.

"Unmasked, I bear no resemblance whatever to a man, but rather to some ghastly, drug-inspired dream or nightmare of an Oriental Dante. The fact that I have sacrificed my human appearance in the Great Cause cannot overcome the shrinking aversion that normal men would feel, if they could see me. I say only this, that my mutilation is indescribable. As the officer and gentleman I know you to be, you won't ask me to expose this horror!"

CHAPTER IV

The Masked Recruit

A LITTLE silence lengthened, while the strange aviator continued to peer out with strangely shining eyes through the holes of his mask. The effect of that human intelligence, sheltered in there behind that expressionless celluloid, whose frail thinness they all knew covered unspeakable frightfulness, became uncanny.

Some of the men eased the tension by blowing ribbons of smoke or by relighting tobacco that had gone out while the stranger had been talking. Others shifted, a bit uneasily. Voices began to mutter, pro and con. The Master suddenly knocked again, for silence.

"I am going to accept this man," said he, sharply. "You notice I do not put this to a vote, or consult you about it. Nor shall I, in anything. The prime condition of this whole undertaking, as I was saying when Captain Alden, here, arrived, is unquestioning obedience to my authority.

"No one who is unwilling to swear that, need go any further. You must have confidence in my plans, my judgment. And you must be willing to obey. It is all very autocratic, I know, but the expedition cannot proceed on any other basis.

"You are to go where I will, act as I command, and only regain your liberty when the undertaking is at an end. I shall not order any man to go anywhere, or do anything, that I would not do myself. On this you can rely. In case of my death, the authority falls on Major Bohannan. He is to-day the only man who knows my plans, and with whom I have had any discussion. If we both are killed, then you can elect your own leader. But so long as either of us lives, you have no authority and no redress. I hope that's perfectly understood. Does any man wish to withdraw?"

Not one budged. All stood to their decision, hard as rock

"Very well," said the Master, grimly. "But remember, disobedience incurs the death-penalty, and it will be rigorously enforced. My word is to be supreme.

"Such being the case, I decide to take this man. His skill as an aviator cannot be denied. We shall need that. His ability to endure suffering and still remain efficient seems proved. That may be valuable; probably will be.

"I shall examine his credentials. If he turns out to be a spy—well, life will be short, for him."

He addressed himself to the masked aviator, who was still standing in an attitude of military attention.

"You are now one of us. You become the thirtieth member of a little group of as brave men, as daring and determined fighters as can be found in America or in the world—all tried and tempered by the fires of war, all decorated for conspicuous valor; all ready to follow me to the ends of the earth and die, if need be; all eager to share in an undertaking as yet unknown to them, but one that promises to be the most extraordinary adventure ever undertaken on this planet. You understand all that, sir?"

"I do!"

"Raise your right hand, sir."

The aviator obeyed.

"All the others, too!"

Every hand went up.

"Swear allegiance to me, fidelity, secrecy, courage, obedience. On the thing you hold most dear, your honor as fighting men, swear it!"

The shout that answered him, from every throat,

made the eagle's-nest ring with wild echoes. The Master smiled, as the hands sank.

"With men like you," said he, "failure is impossible. The expedition is to start at once, to-morrow night. No man in it has now any ties of home or kin that overbalance his ties to me and to the *esprit de corps* of our body.

"The past is dead, for you. The future is all a mystery. You are to live only in the present, day by day. And now, for some practical details.

"The means of transport, you do not know. The perils and rewards are problematical. Of the former there will be enough; as for the latter, those lie on the knees of the gods. There will be no payment for any man. Not a cent of money is involved in this service.

"Commissary will be furnished. Each man is to wear his campaign equipment—his uniform and such kit as he can store in a rucksack. Bring small-arms and ammunition. In addition, I will furnish bombing material and six Lewis guns, with ammunition, also other materials of which I shall now say nothing. These things will be transported to the proper place without labor on your part. I think I have made the outlines of the matter reasonably clear."

"Our orders, sir?" asked a voice with a French accent, down the table. "Are we to have no precise orders before leaving this room?"

"You are. Each man will receive his own, sealed, before leaving. I am now about to give them out, in alphabetical rotation. This will dismiss the meeting. You will withdraw as inconspicuously as you came. Remember, you are to become as cogs in the machine that I have devised. At the exact place, hour, minute and second you are to do exactly the thing ordered, *and nothing else*. Neglect, disobedience or failure will positively not be condoned, but will be punished as I see fit, even to the death penalty.

"Come forward now, as I call your names, and receive what I shall give you."

He opened a drawer in the table, took out many small boxes and arranged them before him. Each box was carefully wrapped in stout paper, secured, tied and sealed with red wax.

Standing there, firm, impassive, with narrowed eyes, he began reading the names:

"Adams — Auchincloss — Brodeur — Cacowitz — Daimamoto — Emelio — Frazier—"

As each man's name was uttered, he came down along the table, took the box extended to him, thrust it into his pocket, saluted stiffly, and withdrew in silence. At the end of a few minutes, no one was left but the Master, Bohannan and the man in the celluloid mask.

The Orders

"HAVE you no orders for me, sir?" asked the aviator, still erect in his place at the far end of the table. His eyes shone out darkly through his shield.

"None, sir."

"All the others—"

"You are different." The Master set hands on his hips, and coldly studied this strange figure. "The others have had their orders carefully worked out for them, prepared, synchronized. You have come, so to speak, as an extemporization, an auxiliary; you will add one more unit to the flyers in the expedition, of which there are nine aces, including Major Bohannan, here. The others are now on their way to their lodgings, to study their instructions, to memorize, and prepare to carry them out. You are to remain here, with Major Bohannan and with me."

"Until what time, sir?"

"Until we start. You will be under continual surveillance. If you make any attempt to communicate in any way with anyone outside my apartment, it will be the last thing you will ever do. You will receive no other warning. To-morrow night you will accompany us. Till then, you remain my—guest."

The aviator nodded.

"Very well, sir," he accepted. "But, my machine?"

"I will attend to your machine."

"I should hate to leave it there, on the roof."

"It will not be left on the roof."

"I don't understand, exactly—"

"There will be very many things you do not understand before this expedition is ended. I need say no more."

Sharply he clapped his hands, thrice. In a moment, Rrisa appeared in the door. The Master spoke a few guttural, aspirated words of Arabic. Rrisa beckoned the stranger, who obeyed.

At the exit he faced about, and sharply saluted. The Master returned it. Then he vanished, and the door noiselessly closed behind them.

The Master turned to Bohannan.

"Now," said he, "these few last details. Time is growing very short. Only a few hours remain. To work, major—to work!"

At this same moment Auchincloss had already arrived at his rooms in the McAlpin; and there, having carefully locked his door, had settled himself at his desk with his sealed box before him.

For a moment he studied it, under the electric light. Then, breaking the wax with fingers tensed by eagerness, he tore it open. He spread the contents on his blotting-pad. There was a small pocket-compass of the best quality, a plain-cased watch wound up and going, a map and a folded sheet of paper covered with typewriting. Auchincloss fell to reading:

GENERAL ORDERS

You are to learn your specific orders by heart, and then destroy this paper. You are to act on these orders, irrespective of every other man. You are not to communicate the contents of this paper to any other. This might upset the prearranged plan. You might try to join forces, assist each other, or exercise some mistaken judgment that might result in ruin. Each man is to keep his orders an absolute secret. This is vital.

Each man, like yourself, is provided with a map, a watch and a compass. These watches are all self-luminous, all accurately adjusted to synchronize to the second, and all will run forty-eight hours.

SPECIFIC ORDERS

To-morrow, proceed inconspicuously to Tenafly, New Jersey, and hire a room at the Cutter Inn. Carry your kit in a suit-case. At 7:30 P. M., go to Englewood. Go up Englewood Avenue toward the Palisades, turn left (north) along the road near edge of cliff; proceed half a mile and enter woods at your right. There you will find path marked "A" on your map. Put on rucksack and discard suit-case, which, of course, is to have no identifying marks. Proceed along path to point "B," and from under board you will find there take box with weapon enclosed. Box will also contain vacuum search light and directions for use of weapon, exact time, direction and elevation for discharging same, and further instructions how to proceed. Act on these to the second. If interfered with, kill; but kill quietly, so as to avoid giving the alarm.

I expect every man to do his duty to the full. There will be but one excuse for failure, and that is death.

THE MASTER.

CHAPTER V

In the Night

THE night was moonless, dark, warm with the inviting softness of late spring that holds out promises of romance. Stars wavered and wimpled in

the black waters of the Hudson as a launch put out in silence from the foot of Twenty-seventh Street.

This launch contained four men. They carried but little baggage; no more than could be stowed in a rucksack apiece. All were in their old service uniforms, with long coats over the uniforms to mask them. All carried vacuum-flashlights in their overcoat pockets, and lethal-gas pistols, in addition to ordinary revolvers or automatics. And all were keyed to the top notch of energy, efficiency, eagerness. The Great Adventure had begun.

In the stern of the swift, twenty-four cylinder launch —a racing model—sat Captain Alden and Krisa. The captain wore his aviator's helmet and his goggles, despite the warmth of the night. To appear in only his celluloid mask, even at a time like this when darkness would have hidden him, seemed distasteful to the man. He seemed to want to hide his misfortune as fully as possible; and, since this did not harm, the Master let him have his way.

The bow was occupied by the Master and by Major Bohannan, with the Master at the wheel. He seemed cool, collected, impassive; but the major, of hotter Celtic blood, could not suppress his fidgety nervousness.

Intermittently he gnawed at his reddish mustache. A cigar, he felt, would soothe and quiet him. Cigars, however, were now forbidden. So were pipes and cigarettes. The Master did not intend to have even their slight distraction coming between the minds of his men and the careful intricate plan before them.

As the racer veered north, up the broad darkness of the Hudson—the Hudson sparkling with city illumination on either hand, with still or moving ships' lights on the breast of the waters—Bohannan murmured:

"Even now, as your partner in this enterprise—"

"My lieutenant," corrected the Master.

"As second in command," amended Bohannan, irritably, "I'm not wholly convinced this is the correct procedure." He spoke in low tones, covered by the purring exhaust of the launch and by the hiss of swiftly-cloven waters. "It looks like unnecessary complication, to me, and avoidable danger."

"It is neither," answered the man at the wheel. "What better plan could you have proposed?"

"You could have built your own flyer, couldn't you? Since money's no object to you, and you don't even know, accurately, how much you've got—nobody can keep track of figures like those—why risk legal interference and international complications at the start, l y—"

"To build the kind of flyer we need would have taken six or seven months. Not all my money could have produced it, sooner. And absolute ennui can't wait half a year. I'd have gone wholly stale, and so would you, and all of them. We'd have lost them.

"Again, news of any such operations would have got out. My plans would possibly have been checkmated. In the third place, what you propose would have been tame sport, indeed, as a beginning! Three excellent reasons, my dear major, why this is positively the only way."

"Perhaps. But there's always the chance of failure, now. The guards—"

"After your own experience, when that capsule burst in the laboratory, you talk to me about guards?"

"Suppose one escapes?"

The Master only smiled grimly, and sighted his course up the dark river.

"And the alarm is sure to be given, in no time. Why didn't you buy the thing, outright?"

"It's not for sale, at any price."

"Still—men can't run off with three and a half million dollars' worth of property and with provisions and equipment like that, all ready for a trial trip, without raising hell. There'll be pursuit—"

"What with, my dear Bohannan?"

"That's a foolish statement of mine, that last one, I admit," answered the major, as his companion swung the launch a little toward the Jersey shore. "Of course nothing can overhaul us, once we're away. But you know my type of mind weighs every possibility, pro and con. Wireless can fling out a fan of swift aerial police ahead of us, from Europe."

"How near can anything get to us?"

"I know it all looks quite simple. Nevertheless—"

"Men of your character are useful, in places," said the Master, incisively. "You are good in a charge, in sudden daring, in swift attack. But in the approach of great decisions, you vacillate. That's your racial character.

"I'm beginning to doubt my own wisdom in having chosen you as next in command. There's a bit of doubting Thomas in your ego. It's not too late, yet, for you to turn back. I'll let you, as a special concession. Brodeur will jump at the chance to be your successor."

His hand swung the wheel, sweeping the racer in a curve toward the Manhattan shore. Bohannan angrily pushed the spokes over again, the other way.

"I stick!" he growled. "I've said the last word of this sort you'll ever hear me utter. Full speed ahead—to Paradise or Hell!"

They said no more. The launch split her way swiftly toward the north. By the vague, ghostly shimmer of light upon the waters, a tense smile appeared on the steersman's lips. In his dark eyes gleamed the joy that to some men ranks supreme above all other joys—that of bending others to his will, of dominating them, of making them the puppets of his fancy.

Some quarter-hour the racer hummed up-river. Keenly the Master kept his lookout, picking up landmarks. Finally he spoke a word to Captain Alden, who came forward to the engines. The Master's cross-questionings of this man had convinced him his credentials were genuine and that he was loyal, devoted, animated by nothing but the same thirst for adventure that formed the driving power behind them all. Now he was trusting him with much, already.

"Three-quarters speed," ordered the Master. The skilled hand of the captain, well-versed in the operation of gas-engines, obeyed the command. The whipping breeze of their swift course, the hiss at the bows as foam and water crumbled out and over, somewhat diminished. The goal lay not far off.

Destroying Clues

TO starboard, thinning lights told the Master they were breasting Spuyten Duyvil. To port, only a few scattered gleams along the base of the cliff or atop it showed that the sparsely-settled Palisades were drawing abeam. The ceaseless, swarming activities of the metropolis were being left behind. Silence was closing in, broken only by vagrant steamer-whistles from astern.

A crawling string of lights, on the New York shore, told that an express was hurling itself cityward. Its muffled roar began to echo out over the star-flecked waters. The Master threw a scornful glance at it. He turned in his seat, and peered at the shimmer of the city's lights, strung like a luminous rosary along the river's edge. Then he looked up at the roseate flush on

the sky, flung there by the metropolis as from the mouth of a crucible.

"Child's play!" he murmured. "All this coming and going in crowded streets, all this fighting for bread, and scheming over pennies—child's play. Less than that—the blind swarming of ants! To-morrow, where will all this be, for us?"

He turned back and thrust over the spokes. The launch drew in toward the Jersey shore.

"Let the engines run half-speed," he directed, "and control her now with the clutch."

"Yes, sir!"

The aviator's voice was sharp, precise, determined. The Master nodded to himself with satisfaction. This man, he felt would surely be a valued member of the crew. He might prove more than that. There might be stuff in him that could be molded to executive ability, in case that should be necessary.

The launch, now at half-speed, nosed her way directly toward the cliff. Sounds from shore began to grow audible. Afar, an auto-siren shrieked. A dog barked, irritatingly. A human voice came vaguely hallooing.

Off to the right, over the cliff-brow, a faint aura of light was visible. The eyes of the Master rested on this a moment, brightening. He smiled again; and his hand tightened a little on the wheel. But all he said was:

"Dead slow, now, Captain Alden!"

As the cliff drew near, its black brows ate across the sky, devouring stars. The Master spoke in Arabic to Rrisa, who seized a boat-hook and came forward. Out of the gloom a small wharf advanced to meet the launch. The boat-hook caught; the launch, easing to a stop, cradled against the string-piece.

Rrisa held the hook, while Bohannan and Alden clambered out. Before the Master left, he bent and seemed to be manipulating something in the bottom of the launch. Then he stepped to the engine.

"Out, Rrisa," he commanded, "and hold hard with the hook, now!"

The Arab obeyed. All at once the propeller churned water, reversed. The Master leaped to the wharf.

"Let go—and throw the hook into the boat!" he ordered.

While the three others stood wondering on the dark wharf, the launch began to draw slowly back into the stream. Already it was riding a bit low, going down by the bows.

"What now?" questioned the major, astonished.

"She will sink a hundred or two yards from shore, in deep water," answered the Master, calmly. "The sea-cock is wide open."

"A fifteen thousand dollar launch—!"

"Is, none the less, a clue. No man of this party, reaching this shore to-night, is leaving any more trace than we are. Come, now, all this is trivial. Forward!"

In silence they followed him along the dark wharf, reached a narrow, rocky path that serpented up the face of the densely-wooded cliff, and began to ascend. A lathering climb it was, laden as they were with heavy rucksacks, in the moonless obscurity.

Now and then the Master's little searchlight—his own, wonderful invention, a heatless light like an artificial firefly, using no batteries nor any power save universal, etheric rays in an absolute vacuum—glowed with pale virescence, flickering over some particularly rough bit of going. For the most part, however, not even this tiny gleam was allowed to show. Silence, darkness, precision, speed were now all necessary.

Twenty-four minutes after leaving the wharf, they stood among a confused, gigantic chaos of boulders flung, dice-like amid heavy timber on the brow of the Palisades. Off to the north, the faint, ghostly aura dimly silhouetted the trees. Far below, the jetty river trembled here, there, with starlight.

They paused a moment to breathe, to shift straps that bound shoulders not now hardened to such burdens. The Master glanced at the luminous dial of his wrist-watch.

"Almost to the dot," he whispered. "Seventeen minutes to midnight. At midnight, sharp, we take possession. Come!"

They trailed through a hard, rocky path among thick oak, pine and silver-birch. Now and then the little greenish-white light will-o'-the wisped ahead, flickering hither, yon. No one spoke a word. Every footstep had to be laid down with care. After three minutes' progress, the master stopped, turned, held up his hand.

"Absolute silence, now," he breathed. "The outer guards are now within an eighth of a mile."

They moved forward again. The light was no longer shown, but the Master confidently knew the way. Bohannan felt a certain familiarity with the terrain, which he had carefully studied on the large-scale map he and the Master had used in planning the attack; but this intimate knowledge was not his. After two and one-half minutes, the leader stopped again, and gestured at heavy fern-brakes that could just be distinguished as black blotches in the dark of the woods.

"The exact spot," he whispered. "Take cover, and follow your memorized orders!"

He settled down noiselessly into the brakes. The others did likewise. Utter silence fell, save for the far, vague roar of the city. A vagrant little breeze was stirring the new foliage, through which a few stars curiously peeped. The four men seemed far, very far from any others. And yet—

Were there any others near them? the major wondered. No sign, no sound of them existed. Off to northward, where the dim glow ghosted up against the sky, an occasional noise drifted to the night. A distant laugh diffused itself through the dark. A dog yapped; perhaps the same that they had heard barking a few minutes before. Then came the faint, sharp tapping of a hammer smiting metal.

"They're knocking out the holding-pins," thought the major. "In a few minutes it'll be too late, *if* we don't strike now!" He felt a great temptation to urge haste, on the Master. But, aware of the futility of any suggestion, the risk of being demoted for any other *faux pas*, he bridled his impatience and held still.

The Zero Hour

REALIZING that they were now lying at the exact distance of 440 yards from the stockade that protected the thing they had come to steal—if you can call stealing the forced sale the Master now planned consummating. (His bankers were ordered to put into unwilling hands every penny of the more than $3,500,000 involved, once the *coup* should be put through)—realizing this fact, Bohannan felt the tug of a profound excitement.

His pulses quickened; the tension of his Celtic nerves keyed itself up like a banjo-string about to snap. Steeled in the grim usages of war though he was, and more than once having felt the heart-breaking stress of the zero hour, this final moment of waiting, of suspense before the attack that was so profoundly to affect his life and the lives of all these hardy men, pulled heavily at his nerves. He desperately wanted to smoke, again, but that was out of the question. It seemed to him,

there in the dark and stillness, one of the fateful moments of time, pregnant with possibilities unlimited.

The Master, Alden, Rrisa, mere vague blurs among the ferns, remained motionless. If their nerves were a-tingle, they gave no hint or sign of it. Where might the others of the Legion be? No indication of them could be made out. No other living thing seemed in the woods encircling the stockade. Were the men really there and ready each for the predetermined role he was to play?

It seemed incredible, fantastic, to suppose that all those adventurers, each separate and alone, each having no contact with any other, should all have taken their assigned posts. That each, with luminous watch on wrist, was even now timing himself, to the second, before striking the single note calculated to produce, in harmony with all the rest, the finished composition. Such an assumption partook more of the stuff of an Arabian Nights tale than of stern reality in this Twentieth Century and on the outskirts of the world's greatest city. But—

The Master, crouching, whispered:

"Two minutes more! Keep your eyes on your watches, now. Get your lethal guns ready! In 120 seconds, you will hear the first capsule burst. Ten seconds after, Alden, fire yours. Ten later, yours, Bohannon. Ten later, yours, Rrisa. Listen hard! Hold steady!"

The silence drew at them like a pain. Rrisa breathed something in which the words: *"La Illaha Illa Ala"* transpired in a wraith of sound. Alden nestled closer into the ferns. Bohannan could hardly hold his poise.

All three now had their capsule-pistols ready. The self-luminous compass and level attached to each gun gave them their exact direction and elevation. Glimmering watches marked the time, the dragging of the last few seconds.

The Master drew no weapon. His mind, directing all, observing all, was not to be distracted by even so small a detail as any personal hand in the discharge of the lethal gas.

If he felt the strain of the final moment, on which hung vaster issues than mere life or death, he gave no indication of it. His eyes remained fixed on the watch-dial at his wrist. They were confident, those eyes. The vague shimmer of the watch-glow showed them dark and grave; his face, faintly revealed, impassive, emotionless.

It seemed the face of a scientist, a chemist who—having worked out his formula to its ultimate minutiæ—now felt utter trust in its reactions, now was only waiting to observe what he well knew must inevitably happen.

"Thirty seconds more," he whispered, and fell silent. Presently, after what seemed half an hour: "Fifteen!"

Another long wait. The Master breathed:

"In just five seconds the first capsule will burst *there!*" He pointed with assurance. "In two—in one—"

CHAPTER VI

The Silent Attack

At the exact instant when the second-hand notched on the minute's edge, and in precisely the spot indicated, a slight, luminous spot became dimly visible above the trees. This spot took uncertain form high above the ghost-glow rising from the unseen stockade. For an instant it hung suspended, pale-greenish, evanescent.

Then, as a faint *plop!* drifted to the watchers—a sound no louder than a feeble clack of the tongue—this indefinite luminosity began to sink, to fade, falling slowly, gradually dissipating itself in the dim light over the stockade.

The Master nodded, smiling, with never any hint of praise or approbation. The fulfilment of his order was to him no other than it is to you, when you drop a pebble into water, to hear the splash of it. That his plan should be working out seemed to him a perfectly obvious, inevitable thing. The only factor that could possibly have astonished him, just now, would have been the non-appearance of that slight, luminous cloudlet at the precise spot and moment designated.

Neither Bohannan, Alden nor Rrisa was watching the slow descent of the lethal gas. All three had their eyes fixed on their own lethal-gas pistols and on their watches. At mathematically the correct second, Bohannan discharged his piece, correctly sighting direction and elevation.

As he pressed trigger, a light sighing eased itself from the slim barrel. Something flicked through the leaves; and, almost on the instant, the phenomenon of the little phosphorescent spot repeated itself, though in a different place from the first one. Captain Alden's and Rrisa's shots produced still other blurs of virescence.

Then, as they all waited, crouching, came another and another tiny explosion, high aloft, at precisely ten-second intervals. Here, there they developed, until twenty-nine of these strange, bubblelike things had burst above and all about the huge enclosure. Then darkness and silence once more settled down.

Nothing seemed to have happened. Night still reigned, starry with glimpses of sky through wind-swayed trees. One would have said everything still remained precisely as it had been before.

Yet presently, within the stockade or near it, a certain uneasy mélange of sounds began to develop. Here a cry became audible, there a command. A startled voice called an order, but suddenly fell silent, half-way through it. The worrying of the dog ceased with eloquent suddenness. A curse died, unfinished.

And silence, as perfect as the silence of the unseen watchers strung all about the periphery of the stockade, once more dominated the night.

For precisely ten minutes, nothing broke that silence—minutes during all of which the Master remained calmly waiting, with grave confidence. Bohannan shuddered, a little. His Celtic imagination was at work, again. Uncanny the attack seemed to him, unreal and ghostlike. So, perhaps, might strange, unbelievable creatures from some other planet attack and conquer the world, noiselessly, gently, irrevocably.

This assault was different from any other ever made since man and man first began battling together in the dim twilights of the primeval. Not with shout and cheer did it rush forward, nor yet with strangling gases that gave the alarm, that choked, that strangled, that tortured.

Silence and concealment, and the invisible blight of sleep, like the greater numbing that once fell on the hosts of Sennacherib, enfolded all opposition. All who would have stood against the legion, simply sighed once, perhaps spoke a few disjointed words, then sank into oblivion.

So far as any one could see, save for the bursting of twenty-nine insignificant little light bubbles, in mid air, nothing at all had happened. And yet tremendous things had happened, inside the huge stockade.

Ten minutes to a dot had drifted by, seeming at least

six times as long, when all at once the Master stood up.

"The gas has dissipated enough now," said he, "so that we can advance in safety. Come!"

The others also arose, half at his command, half from the independent impulses given them by their watches as these came to the designated second for the forward movement. The Master blew no whistle, gave no signal to the many others scattered all through those darkly silent woods; but right and left, and over beyond the stockade, he knew with the precision of a mathematical equation every man was at that precise moment also arising, also obeying orders, also preparing to close in on the precious thing whereof they meant to make themselves the owners.

Forward the Master made his way, with the three others of his immediate escort. Though there no longer existed any need of silence, hardly a word was spoken. Something vast, immanent, overpowering, seemed to have laid its finger on the lips of all, to have muted them of speech

The vacuum-lights, however, were now freely flashing in the little party, as it advanced directly toward the stockade. The men clambered over rocks, through bushes, across fallen logs. Rrisa stopped, suddenly, played his light on a little bundle of gray fur, and touched it with a curious finger. It was a squirrel, curled into a tiny ball of oblivion.

Alden's foot narrowly missed the body of a sleeping robin. An owl, lodged in the fork of a tree, moved not as the men passed. It, too, was whelmed in deep, temporary Nirvana.

The party's next find arrested them, with a thrill of genuine emotion, a triumph that could not be denied some few half-whispered exclamations of exultation from the Master's three companions. He himself was the only one who spoke no word. But, like the others, he had stopped and was painting the beam of his light on the figure lying inert among broken bushes.

With his toe he touched this figure. His light picked up the man's face from the gloom. That face was looking at him with wide-open eyes. The eyes saw nothing, but a kind of overwhelming astonishment still seemed mirrored there, caught in the last moment of consciousness as the man had fallen.

The effect was starthng, of that sleeping face, those open eyes, that lax mouth. The man was breathing easily, peacefully as a tired child. The Master's brows contracted a little. His lips tightened. Then he nodded, and smiled the ghost of a smile.

"Lord!" exclaimed Bohannan, half-awed by the weirdness of the apparition. "Staring at us, that way—and all! *Is* he asleep?"

"Try him in any way your ingenuity may suggest," answered the Master, while Alden blinked strangely through his eyeholes and Rrisa in Arabic affirmed that there is no God but Allah. "Try to force some sense-impression to his brain. It is sleep, but it is more than that. The best experiment for any doubting Thomas to employ is just to waken this guard—if possible."

Bohannan shook his head.

"No," he answered, "I'm not going to make a fool of myself. There's no going against any of your statements. I'm beginning to find that out, definitely. Let's be on our way!"

A Sleeping World

THE Master spoke a few quick words of Arabic to his orderly. Rrisa knelt by the prostrate man. Then, while the Master kept the light-beam on him, Rrisa unbuckled the guard's belt, with cartridges and holster containing an ugly-snouted gun. This belt the Arab slung round his own body. He arose. In silence, leaving the unconscious man just as he had fallen, they once more pushed onward.

Lights were beginning to gleam ahead, now, in what appeared to be a long, high line. The trees half-hid them, but moment by moment they appeared more distinctly Meantime, too, the glow over the stockade was getting stronger. Presently the trees ceased; and there before them the men saw a wide, cleared space, a hundred feet of empty land between the woods and a tall, stout fence topped with live wires and with numerous incandescents.

"Nice place to tackle, if anybody were left to defend it!" commented Bohannan. None of the others answered. The Master started diagonally across the cleared space, toward a cluster of little buildings and stout gate-posts.

Hardly had they emerged from the woods, when, all up and down the line, till it was broken by the woods at both ends where the stockade joined its eastern and western wall, other men began appearing. And all, alike converged toward the gate.

But to these, the little party of four gave no heed. Other men absorbed their interest—sleeping men, now more and more thickly scattered all along the stockade. Save for a slight, saline tang to the air—an odor by no means unpleasant—nothing remained of the lethal gas.

But its effects still lay there, prone, in every possible attitude of complete and overpowering abandonment. And all, as the party of four passed, were quickly disarmed. Up and down the open space, other legionaries were at the same work.

The Master and his companions reached the gatehouse first of any in the party. The gate was massive, of stout oaken planks heavily strapped with iron. About it, and the gatehouse, a good many guards were lying. All showed evidence of having dropped asleep with irresistible suddenness.

Some were gaping, others foolishing grinning as if their last sensation had been agreeable—as indeed it had been—while others started disconcertingly. The chin of one showed an ugly burn where his Turkish cigarette had fallen, and had smouldered to extinction on the flesh.

One had a watch in his hand, while another gripped a newspaper. In the gatehouse, two had fallen face-downward on the table that occupied the center of the rough room; checker-pieces lay scattered from the game they had been playing. Several men sprawled just outside the little house, on the platform. Under the incandescents, the effect grew weird.

Bohannan shuddered, as he glanced from one to another, then up at some of the approaching men of the expedition. Rrisa affirmed that Mohammed was indeed the prophet of Allah, and that the ways of the *Nasara* were most strange

"Good!" exclaimed the Master, with his first word of approval. Even his aplomb was a little shaken by the complete success of the attack. "It's all working like a clock."

"How about disarming these men, sir?" queried Captain Alden.

"No. They fall under the orders of another group."

"The way is clear, then—"

"Absolutely! These men will sleep almost precisely thirty minutes. The way is clear, ahead of us. Forward, into Palisade!"

CHAPTER VII

The Nest of the Great Bird

AS the little group of four penetrated into the enclosure which but a few moments before had been guarded all round its perimeter by a small army of determined men, more and more of the legionaries began to concentrate toward the entrance.

Silently they came, with almost the precision of automata in some complex mechanical process. All were obeying the Master's will, because obedience was sweet to them; because it spelled adventure, freedom, life.

Now and then one stopped, bent, arose with some added burden taken from a fallen guard. Not one guard was to be injured in any way. Human life was not to be taken. But nothing in the way of armament was to be left, by way of possible danger to the Legion. And already the telephone-wires had been effectively cut.

All the approaching legionaries wore rucksacks, and all were in their respective uniforms, though every man still wore the long coat that concealed it. A few groups of two appeared, bearing rather heavy burdens.

The Master smiled again, and nodded, as he paused a moment at the gate to peer down along the line of the clearing between stockade and forest.

"Here come some of the machine-guns," said he. "I shall be vastly surprised if one man or one single bit of equipment fails to appear on schedule time. Nothing like system, Bohannan—that, and knowing how to choose your men!"

He turned, and the other three followed him into the enclosure. Outside, all was developing according to plans and specifications. These four were to be pioneers into the jealously-guarded space that for so long had been the mystery of the continent, yes, of the civilized world.

The whole enclosure was well-lighted with a profusion of electric lamps. At first view, quite a bewildering mass of small buildings appeared; but second glance showed order in them all. Streets had been laid out, as in a town; and along these streets stood drafting-sheds, workshops, storehouses, commissary offices, dwellings for the workers, guards and bosses. A well-built cottage on the main, forward-going road that led from the gate to an inner stockade, was probably headquarters for the chief engineers.

Not one sign of conscious life appeared. Men were lying here, there, in the roadways, in the porches, in the shadow of the power-plant where dynamos were still merrily singing. Few were armed. Most of them here were workers, judging by their garb and by the tools still in some hands.

The four pioneers gave them no heed, but pushed steadily on. In the road a couple of pigeons lay here, further a sparrow, and still further a sleeping dog, showed how complete had been the effect of the lethal pellets.

The inner stockade was now close. It stood about twice as high as the outer, was also topped with live wires and lights, and was loopholed for defense. This formidable barrier was pierced by a small gate, flanked by two machine-guns. On the gate-post was affixed an elaborate set of rules regarding those who might and might not enter. The Master smiled dryly, and opened the gate.

Even from without, the loom of the monstrous aircraft had been visible. The eye could hardly at first glance take in the vastness of this stupendous thing, that overshadowed all the central portion of the huge enclosure. It gave a sense of power, of swift potentialities, of speed unlimited. It stood there, tense, ready, waiting, with the hum of engines audible in his vast heart, a thing almost of life, man's creation but how illimitably greater than man!

For a moment, as this tremendous winged fabric came to the Master's view, he halted and a look of exultation, pride, and joy came over his face. But only for a moment. Quite at once his dark eyes veiled themselves with their habitual impassivity. Once more he strode forward, the others following him.

Now that they were inside the second barrier—where sleeping men were scattered more thickly than ever—they stood under the very wings of the most stupendous hydroplane ever conceived by the brain of man or executed by the cunning of his hand.

That this hydroplane had been almost on the moment of departure for its trial trip, was proved by the sleepers. Two were on the gangplank leading up to the entrance-door in the fuselage. A number who had been knocking out the last holding-pin of the last shackle that bound it to its cradle, had fallen to earth, their hammers near at hand.

In the pilot-house, a figure had collapsed across the sill of an observation-window. And the engines, purring softly, told that all had been in readiness for the throwing-in of the clutches that would set the vast propellers spinning with roaring speed.

"Yes, they were certainly just on the dot of getting away," said the Master, nodding as he glanced at his watch. "This couldn't be better. Gas, oil, stores, everything ready. What more proof do you require, my dear Bohannan, of the value of exact coordination?"

The major could only answer: "Yes, yes—" He seemed quite amazed by this extraordinary mechanism—gigantic, weird, unreal in the garish electric lights. Rrisa was frankly staring, for once shaken out of his fatalistic Mussulman tranquility.

As for Captain Alden, he stood there a compact, small figure in his long coat with the rucksack strapped to his shoulders, peering up with the eye of the connoisseur. His smile was one of contentment absolute.

"My beauty—ah, my beauty!" he was murmuring.

On Schedule

THEN, in the presence of this mighty thing, silence fell on all. The major set hands on hips, blinked, puckered his lips, and silently whistled. His expression was half incredulous, half enthusiastic.

What Alden was thinking revealed itself by the sparkle of his eyes through the holes of the mask behind the goggles. Expressionless though that terribly mutilated face had to remain, you could sense in the man's whole attitude the exultation of the expert ace as he beheld the perfect machine.

The droning of the engines came distinctly to them all, a low, steady, powerful note, beautiful in its steady undertones of strength. Behind the little group, a few involuntary exclamations of astonishment and joy became audible, as some of the legionaries came into the second enclosure.

Without, blows on metal sharply resounded. The Master smiled again, as he realized his orders were going on with exact precision.

"That's the wireless they're putting out of commission," thought he, glancing at his watch again. "No mere untuning of wave-lengths. Good, old-fashioned hammer-blows! *This* station won't work again for a while!"

Bohannan, meantime, was trying to get some general impression of the giant plane. Not all the Master's descriptions of it, to him, had quite prepared him for the reality. Though he well knew all the largest, biggest machines in the world, this stupendous creation staggered him. By comparison with the Handley-Page, the Caproni, the D.H.-4, the Gotha 90-120, the Sikorsky, it spread itself as an eagle spreads beside a pigeon.

It lay in a kind of metallic cradle, almost like a ship ready for launching on its ways. Ahead of it, metal plates stretched away like rails, running toward the lip of the Palisades. Its quadruple floats, each the size of a tugboat and each capable of being exhausted of air, constituted a potential lifting-force of enclosed vacuums that very largely offset the weight of the mechanism. It was still a heavier-than-air machine, but the balance could be made nearly perfect. And the six helicopters, whose cylindrical, turbine-like drums gleamed with metallic glitters—three on each side—along the fuselage could at will produce an absolutely static condition of life or even make the plane lower and soar quite vertically.

There the monster lay, outstretching its enormous sextuple wings, each with an area of 376 feet by 82.5. The non-inflammable celluloid surfaces shone white as fresh-cut ivory, clean, smooth, unbreakable. The plane reminded one of some Brobdingnagian dragon-fly, resting for flight, shimmering with power as it poised for one swift leap aloft into the blue.

Bohannan, still a bit confused, noted the absence of any exhaust from the speeding engines. This, too, gave a sense of vast, self-contained power. He saw stupendous propeller-blades, their varnished surfaces flicking out high-lights as the incandescents struck them. Motionless these propellers were; but something in their tense, clean sweep told of the raging cyclone to which they could whip the air, once the spinning engines should be clutched in on their shafts.

The captain's eyes wandered over the whole enormous construction, towering there above him. He saw rows of lighted windows, each cased in shining metal; a V-pointed pilot-house—the same where the still figure was dropped over the sill of the open window—a high-raised rudder of artful curve, vast as the broadside of a barn; railed galleries running along the underbody of the fuselage, between the floats and far aft of them.

Everything gleamed and flickered with bright metal, varnish, snowy celluloid. The body of the machine looked capable of housing twice as many men as the Legion numbered. But everything, after all, was quite shadowed by the overpowering sweep of the wings. These cast their shadow over all. They dwarfed the fast-gathering group that stood peering up at them, like pygmies under the pinions of the fabled roc in Sinbad the Sailor's story.

These stupendous wings, the captain now saw, were not braced together by hampering struts and wires, but seemed cantilevered into position, giving a clean run to the structure, great simplicity and the acme of mechanical beauty. This giant bird of heaven lay in its nest, free of pattern, powerful beyond any air-mechanism ever built by man, almost a living thing, on whose back its captors might ride aloft defying man and nature, to whatsoever goal they chose.

"Everything is ready," said the Master. "That is quite obvious. Let us get aboard now, with no further delay, and be off!"

He drew a little notebook from his pocket, took a pencil, and faced the gathering group inside the second stockade.

"Stow your equipment," he directed, "according to your orders. Ten minutes will be enough for you to unload your machine-guns and all gear, each in the assigned space. Bring out all the sleeping men and lay them down along the stockade, here. Injure no man. Valdez, are the take-off gates, over the Palisade, correctly opened?"

A dark, thin man saluted, as he answered with a Spanish accent:

"Yes, sir. Everything is ready, sir."

"Very well. Now, all to work! And then, each to his place, in engine-room, cabins and where assigned. Come, come!"

As the men trailed up the gang-plank, that steeply rose to the sliding door in the fuselage, the Master checked them on his list. Not one was absent. He shut the note-book with a snap, and slid it back into his pocket.

"This goes on well," he commented to the major. "So far, we are within three minutes eighteen seconds of schedule."

Forward!

THE little group of four stood waiting, watching, while the others carried out all orders, aboard. There was no hesitation, no confusion. Each had already learned the exact plan of the aircraft. Each knew exactly where every door led, what each passageway meant; each understood exactly his own post and what to do there.

Two by two, legionaries came down the gangplank, bearing limp bodies. These they laid in a row along the stockade, till seventeen had accumulated. No more came.

A figure appeared in the sliding doorway, and saluted.

"The last of the sleepers is out, sir," he reported.

The Master nodded, and gestured to his three companions. The group of four ascended the sharp tilt of the plank and entered the airship. As they did so, legionaries hoisted the plank aboard, with its tackle, and lashed it to the waiting chocks. Others could be heard, in the penetralia of the vast structure, coming, going, busily at work.

The entrance-door slid shut. A bolt shot home. All the Legion was now aboard, and communication with the ground had been broken.

The four men found themselves in a brightly-lighted corridor that led directly across the fuselage to a similar door on the other side. This corridor was of some metal, painted a glossy white. Doors opened out of it, on either hand. Its length was just a few inches over forty-one feet. Half way along it, a wider corridor crossed it at right angles—the main passage of the ship.

The Master led the way toward this median corridor. His tall, big-shouldered figure swung along, triumphant, impressive in the long coat, dominant and free. Followed by the other three, he turned to the left, forward of the ship.

The main corridor, like the other, was flanked by doors. Two or three were open, giving glimpses of comfortable staterooms. The men's footfalls sounded with softened tread on a strip of soft, brown carpet that made pleasant contrast with the gleaming white walls. Light from frosted glass circles, flush with walls and ceiling, made the corridor bright as day.

The Master walked with the confident precision of one who had already passed that way a score of times. He opened the third door on the left—it slid into the wall, instead of swinging, thus economizing space—

and all entered what was obviously the main saloon of the giant plane.

This saloon measured seventeen feet six inches, from corridor to windows, and twenty-nine fore-and-aft. It was furnished with a center-table, book-cases, easy-chairs, two commodious sofa-lockers, and had an excellent carpet. Bohannan noted a Victrola, with many records.

Like all parts of the ship, its lighting was splendid. Well-curtained windows gave it a homelike air. At first glance, one would have thought oneself in a rather luxurious private house; but second inspection showed all possible construction and furnishings were of aluminum alloy, of patterns designed to cut weight to the minimum.

The walls bore lightly-framed photographs of men famous in the annals of flying from Santos-Dumont and the Wrights to Guynemer and Nosworthy; also pictures of famous machines—the Spad, Bristol Fighter, Sopwith Pup, 120-135, and others. More conspicuous than any of these was a framed copy of the International Air Commission's latest condensed rules.

Signs of recent occupancy were not wanting. An extinct cigar lay on the carpet, where it had fallen from the mouth of some airman swiftly overtaken by sleep. The table bore an open cigar-box, several packs of cigarettes with loose "fags" scattered round, and a number of champagne bottles.

Two of these were opened; one had been emptied. The other had lost part of its contents. Several champagne-glasses stood on the table, and one lay on its side, where perhaps a falling hand had overset it. In one of the glasses, a few last, vagrant little bubbles were still rising from the tall, hollow stem.

"Hm!" grunted the Master contemptuously. "Fools! Well—there'll be no alcohol aboard *this* craft!" He loosened the buckles of his rucksack, and cast the burden on one of the sofa-lockers. The others did as much.

"Shall we stow the gear in our cabins?" asked Bohannan, gesturing at the doors that led off the saloon.

"Not yet," answered the Master, glancing at the chronometer that hung beside the air-rules "Time enough to get settled, later. Every second counts, now. We're due to start, in seven minutes, you know. Rrisa will attend to all this. We three have to be getting forward to the pilothouse."

Bohannan nodded.

"Let's have some air in here, anyhow," said he, turning toward one of the windows. "This place is damned st!"

"We'll need all that, soon," the Master commented. "At a few thousand feet, the engine-exhaust through those radiators won't be any too much. Forward!"

CHAPTER VIII

The Eagle of the Air

HE slid open another door. The three men passed through the captain's cabin and pilot-house. This place measured twelve feet on its longest axis and nine on its shortest, being of approximately diamond shape with one point forward in the very nose of the machine, one ending in a door that gave access to the main, longitudinal corridor, and the right and left points joining the walls of the backward-sloping prow. It contained two sofa-lockers with gas-inflated, leather cushions, a chart-rack, pilot's seat, controls and instrument-board.

The whole front was a magnificent stretch of double plate-glass, with warm air between the sheets to keep snow, frost, or dew from obscuring the vision. Bright light flooded it.

Though one window had been slid partly open—the window on the sill of which the sleeping aviator had lain—a scent of cigarette-smoke still permeated the place. The Master sniffed with disgust. Then suddenly, to the great astonishment of Bohannan, he commanded:

"Bring me that champagne, in the saloon. All of it!"

The major opened wide eyes, but unquestioningly obeyed. Could it be possible the Master, in this moment of exultation, was about to break his lifelong rule and drink a toast, in sparkling bubbles, to success thus far achieved, to the stupendous voyage now about to begin?

Wondering, Bohannan departed. The Master gestured for Captain Alden to seat himself on one of the lockers. Alden kept complete silence, as he sat down, crossed one leg over the other and began to study the complex apparatus before him. Most of it was familiar; but some new factors needed inspection.

The Master peered curiously at him. Surely, this man was odd, unusual. Most aviators, thus confronted by strange problems, would have grown loquacious, tried to exhibit their knowledge, asked questions, made much talk. But Alden held his tongue.

A look of appreciation, of liking came upon the Master's face. It was just the suspicion of a look, for in all this strange man's life no great show of emotion had ever permitted to mirror itself upon his countenance. But still, the look was there. He half-opened his lips, as if to speak, then closed them again, and—like Alden—fell to studying the control apparatus.

All was beautifully arranged, all nicely calculated for instant use. Not here, as in small machines, could the pilot handle his own rudders by hand. That would have been as absurd to think of, as for the steersman of a liner to work without the intervention of steam steering-gear.

No, these controls actuated various motors that, using current from the dynamos, produced the desired action with smooth and certain promptness. A turn of the wrist, perhaps no more than the touch of a finger, and the whole vast creation would respond as easily as child's toy can be manipulated by a strong man's hand.

Hooded dials, brightly lighted, push-buttons; a telephone headpiece and receiver combined; switches all lay in easy reach. Here was the tachometer, that would give to a fraction the revolutions of each screw per minute; here the altimeter, to indicate height; here the air speed indicator, the compass with reflector, the inclinometer, the motometers—to show the heat in each engine—and there, the switch to throw on the gigantic searchlight, with the little electric wheel to control its direction, as accurately as you would point a pencil.

Throttle and spark, of course, there were none. All engine-control was by telephone, with the engine-room which lay a little aft of midships. But the controls of the vacuum-apparatus were within easy reach, so that at will the pilot could exhaust the floats, or fill them.

Here were the starting, stopping and speed-controls of the helicopters, which were under direct electrical motivation by the pilot. Here also were the magnetic-anchor release and the air skid pump control; here were telephonic connections with the wireless-room and with the fore and after observation pits, where observers were already lying on their cushions upon the heavy,

metal-reinforced glass floor-plates.

"This is really very complete," approved the Master. Not Alden, but he, had been first to speak. The Master spoke half against his own wish, but a resistless impulse to make some comment, in this moment of triumph, possessed him.

"Only as expected, sir," replied Alden. The Master bit his lip a second, and said no more.

Bohannan's return with several champagne-bottles in his arms, put an end to any possible developments the terse conversation might have had.

"Well, sir," said the major, "here it all is. And I've got glasses in my pocket—and a corkscrew, sir. It never does to forget the corkscrew. We'll drink to happy days, eh, sir?"

Already the Celt's mouth was watering for draughts of the precious liquid. Joy pervaded him that, for once at least, the iron rule of the Master was to be broken, and that the journey was to begin with proper libations. The Master's curt syllables, however, instantly dispelled any illusions he might have entertained on that score.

"Drop them all out that open window, there," commanded the Master.

"What, sir? Good Pommery? Veuve?"

"No argument, Bohannan! Out they go!"

Dismayed, the Celt did the other's bidding, while Alden smiled grimly. Far below, glass crashed and jangled.

"What's the idea?" demanded the major ruefully.

"You know very well, major, my ruling on alcohol. It doesn't mix with any motive power on *this* trip. Moreover, it's customary to christen every launching with champagne. We've done it!"

"Well, that's not so bad an idea, at that," Bohannan admitted, scratching his fiery head. "What name have you given this bus?"

"Nissr Arrib ela Sema."

"Come again, sir?"

"Eagle of the sky, in Arabic. I suppose we'll have to cut that down to *Nissr,* for everyday use. But at any rate, our craft is christened. Well, now—"

He settled himself in the pilot's seat, reached forward and drew toward him a shining metal shaft. Four stout spokes unfolded; and from these, quadrants of a rim that easily snapped together. The Master laid one hand easily on the rim of the big steering-wheel, flung his cap upon a locker, pulled down the telephone headpiece and snapped it over his head.

The First Casualty

HE touched a button. The light died in the pilot house, leaving only the hooded glows of the dials, switches and small levers. Night seemed suddenly to close in about the vast machine. Till now, it had been forgotten, ignored But as darkness fingered at the panes, something of the vastness of sky and air made itself realized; something of the illimitable scope of this adventuring.

Bohannan slid the window shut and settled himself beside Captain Alden. He glanced at his wrist-watch, and a thrill of nervous exultation stabbed him.

"Only two minutes and six seconds more!" he murmured, gnawing at his mustache and blinking with excitement. Alden remained calm, impassive as the Master himself, who now, touching a button, sent a beam of wonderful, white light lancing through the darkness.

Track, buildings, trees all leaped into vivid relief as he tested the search-light control. He shot the beam up, up, till it lost itself, vaguely, in mist and cloud; then flung it even across the river, where it picked out buildings with startling detail.

He turned it, finally, square down the launching-way, through the yawning gates where the track abruptly ended at the brow of the Palisades—the empty chasm where, if all went right and no mistake had been made in build, engine-power or control, the initial leap of *Nissr Arrib ela Sema* was to be made.

Came a moment's wait. Faintly the pulsing of the engines trembled the fabric of *Nissr.* Finely balanced as they were, they still communicated some slight vibration to the ship. The Master snicked the switch of the magnetic-anchor release; and now the last bond that held *Nissr* to her cradle was broken. As soon as the air-skid currents should be set going, she would be ready for her flight.

This moment was not long in coming. Another turn of a switch, and all at once, far below, a faint, continuous hissing made itself audible. Compressed air, forced through thousands of holes at the bottom of the floats, was interposing a gaseous cushion between those floats and the track, just as it could do between them and the earth wherever Nissr should alight.

Suspended thus on a thin layer of air, perhaps no more than a sixteenth of an inch thick but infinitely less friction-producing than the finest ball-bearing wheels and quite incapable of being broken, the ship now waited only the application of the power in her vast propellers.

"Let in number two, and four," commanded the Master, suddenly, into the engine-room telephone. "In five seconds after we start, hook up one and three; and five later, the other two."

"Aye, aye, sir," came back the voice of Auchincloss, chief engineer. "Ready, sir!"

Almost at once, the vibration of the engines altered, grew more marked, seemed to be taking hold of something with strong but easy effort. Another trembling made itself felt, as two of the giant screws, connected by reducing-gears with the engine-shafting—all three engines being geared to one shaft, but any one being capable of separate running—began to revolve.

From astern, a dull, droning hum mounted, rose, grew rapidly in volume and power. And, as two more screws began to whirl, the Eagle of the Air shook herself slightly, awoke from slumber, and steadily, smoothly on her air-cushions, began to move forward down the long, sloping trackway to the brink of the cliff.

"Lord above!" breathed Bohannan, chewing at his nails. We're off!"

Neither the Master nor Captain Alden moved, spoke, manifested any excitement whatever. Both might have been graven images of coolness. The Celt, however, got up and leaned at the window-jamb, unable to keep still. He turned, suddenly to Alden.

"Come, man!" he exclaimed, half-angrily. "Got no heart in you, eh? No interest? Come along out of that, now, and see what's what!"

He laid hold on the captain, and drew him to the window as the airship accelerated her plunge along the rails. The hum of the propellers had now risen to a kind of throaty roar; the craft was shaking with strange quivers that no doubt would cease if she but once could launch herself into the air. Under her, in and in, the shining metal rails came running swiftly and more swiftly still, gleaming silver-like under the vivid beam of the search-light.

Wind began to rise up against the glass of the pilot-house; the wind of *Nissr's* own making.

Cool as if seated in his own easy-chair in the observa-

tory, the Master sat there hand on wheel. Then all at once he reached for the rising-plane control drew it over and into the telephone spoke sharply:

"Full speed ahead, now! Give her all she's got!"

A shout, was it? Many shouts, cries, execrations! But where? Over the roar of the propellers, confused sounds won to the men in the pilot-house. And all at once, by the dim aura of diffused light reflected from the huge beam, the major saw dim figures running, off there to the left, among the buildings of the stockade.

"For the Lord's sake!" he cried, amazed, with drooping jaw. "Men—after us! Look there—*look!*"

The Master was utterly impassive, eyes keen on the inrushing track, now close to its abrupt ending over the vacancy of space. Captain Alden's pupils narrowed, through the mask-holes, but he said nothing. Bohannan gripped the captain's shoulder painfully, then reached for the pistol in his own holster.

"They're on to us!" he vociferated. "Somebody's got wise—they're—"

Little red spurts of fire began to jet, among the buildings; the crackling of shots started popping, like corn kernels exploding. Dark figures were racing for the Palisade gate—the gate where, if the slightest thing went wrong with track or giant plane, the whole vast fabric might crash down, a tangled mass of wreckage.

Then it was, that for the first time in all his knowledge of the Master, Bohannan heard the strange man laugh.

Joyously he laughed, and with keen pleasure. His eyes were blazing, as he thrust the rising-plane lever sharply up.

More shouts volleyed. From somewhere back there in the body of the ship, a cry of pain resounded.

Bohannan flung the window-pane to one side, and blazed away like mad at the attackers.

A shatter of broken glass burst into the pilot-house. Alden, catching his breath, quivered. He uttered no outcry, but his right hand went across and clutched his wounded left arm.

"Got you?" cried the major, still pumping lead. He paused, jerked Alden's automatic from its holster and thrust it into the captain's hand, now red.

Alden, a bit pale but quite impassive, opened fire through the jagged hole in the double pane. Accurately the captain fired at dark figures. One fell; another staggered but as the machine swept on, they lost sight of it.

Men rose before the rushing airship. One of the great gates began to swing shut, far at the end of the track. The Master laughed again, with the wind whipping at his hair. "Full speed ahead!" he shouted into the telephone.

The *Nissr* leaped into a swifter course. Then all at once she skidded clear of the track, slanted upward, breasted the air. Her searchlight flailed. All along her flanks fire-jets spangled the night. Cries echoed from her, from the great stockade.

The Master gave her all the lift the furthest wrench of the levers would thrust on her. The gate was now almost shut—would she clear it?

Below, track, earth, everything was spinning in and in. Ahead, above, yawned vastnesses. The Master could no longer see the gate. A second of taut thrill—

Crash!

The *Nissr* quivered, staggered, yawned away. The forward starboard float had struck. A faint yell rose as some one, hurled backward by the shattered débris of the gate, plunged down the cliff.

For half a second, the giant plane reeled over the abyss. Her rush and fury for that half-second threatened to plunge her, a mangled, flaming wreck, hundreds of feet down on the black, waiting rocks below the Palisades.

But engine-power and broad wings, skill of the hand at the levers, and the good fortune that watches over bold men, buoyed her again. Suddenly she lifted. Up at a dizzy angle she sped. A thing of life, quivering, sentient, unleashed, the gigantic Eagle of the Air—now in heroic flight toward the greatest venturing ever conceived by the brain of man—steadied herself, lifted on the wings of night, and, freed from her last bonds, leaped quivering and triumphant into the sky.

CHAPTER IX

Eastward Ho!

NOT all the stern discipline that had been enforced by the Master—discipline already like a second nature to this band of adventurous men—could quite prevent a little confusion on board The Eagle of the Sky.

As the huge machine crashed, plunged, staggered, then righted herself and soared aloft, shouts echoed down the corridors, shots crackled from the lower gallery and from a few open ports.

At sound of them, and of faint, far cries from the Palisades, with a futile spatter of pistol and rifle-fire, the Master frowned. This intrusion of disorder lay quite outside his plans. He had hoped for a swift and quiet getaway. Complications had been introduced. Under his breath he muttered something, as he wrenched at the controls.

The major, laughing a bit wildly, leaned from the shattered window and let drive a few last pot-shots into the dark, at the faint flicker of lights along the crest of the black cliff. In the gloom of the pilot-house, his shoulders bulked huge as he fired. Captain Alden, staggering back, sat down heavily on one of the sofa-lockers.

One or two faint shots still popped, along the cliff, with little pin-pricks of fire in the dark. Then all sounds of opposition vanished. The *Nissr*, upborne at her wonderful climbing-angle toward the clouds painted by her searchlight—clouds like a rippled, moonlit veil through which peeped faint stars—spiralled above the Hudson and in a vast arc turned her beak into the south.

Disorder died. Silence fell, save for the whistling of the sudden wind of the airship's own motion, and for the steadily mounting drone of the huge propellers.

"Made it all right, by God!" exclaimed Bohannan excitedly. "No damage, either. If the floats had smashed when they hit the gate, there'd have been a devil of an explosion—vacuum collapsing, you know. Close call, but we made it! Now, if—"

"That will do!" the Master curtly interrupted, with steadfast eyes peering out through the conning-windows. Now that the first *élan* of excitement had spent itself, this strange man had once more resumed his mantle of calm. Upborne on the wings of wondrous power, wings all aquiver with their first stupendous leap into the night-sky, the Master—impassive, watchful, cool—seemed as if seated in his easy chair at Niss'rosh.

"That will do, major!" he repeated. "None of your extravagance, sir! No time now for rhodomontade!" He glanced swiftly round, saw Captain Alden by the dim aura of light reflected from the instrument-board. The captain had gone very pale. Blood reddened his left sleeve.

"Wounded, captain?"

"Only a scratch!"

"Report to Dr. Lombardo. And have Simonds, in charge of the stores, replace this broken pane."

"Yes, sir!"

Alden saluted with a blood-stained hand, slipped his gun back into its holster and got up. He swayed a little, with the swinging slide of the air-liner and with the weakness that nerve-shock of a wound brings. But coolly enough he slid open the door leading into the main corridor, and passed through, closing the door after him. Where his hand touched the metal, red stains showed. Neither man of the pair now left in the pilot-house made any comments. That was all in the day's work—this and whatever else might befall.

Spiralling quickly, up, up climbed the giant plane. A colder air nipped through the broken window. Cloud-wisps began to blur the glass; the stars began to burn more whitely in a blacker sky.

The Master touched a button at the left side of the steering post. Below his feet, as they rested in their metal stirrups, an aluminum plate silently slid back. An oblong of dim light blurred up through the heavy plate-glass sheet it had masked.

Glancing down, the Master saw far, far below him a slowing rotating vagueness of waters black and burnished, of faintly twinkling lights. Lights and water drew backward, as the rotary motion gave way to a southern course. The Master slowed the helicopters. A glance at the altimeter showed him 1,965 feet. The compass in its binnacle gave him direction.

"Pit number one!" he sharply exclaimed into the 'phone connecting therewith.

"Yes, sir!" came back the observer's voice.

"Keep a sharp eye out for Niss'rosh! Remember, two red lights showing there!"

"Yes, sir. I'll report as soon as I pick them up."

The Master, knowing his course thither should be S. E. by S., drew the liner to that exact angle. Under his skilled touch at the wheel, the compass-needle steadied to the dot. The searchlight lanced its way ahead, into the vague drift of the smoke arising from New York.

"Sight it, yet?" demanded the Master presently.

"Yes, sir. Just picked it up. Hold hard, sir!"

Almost at once, the Master too got a glimpse of two tiny pin-pricks of crimson, high in air above the city-mass. Swiftly *Nissr* drew over the building. Far, very far down in the chasm of emptiness, tiny strings of light—infinitesimal luminous beads of invisible threads—marked Broadway, Fifth Avenue, countless other streets. The two red winks drew almost underneath.

Down plunged the search-light, picking Niss'rosh out of the gloom. Through the floor-glass, the Master could descry it clearly. He slowed, circled, playing with vacuum-lift, helicopters, engines, as if they had been keys of a familiar instrument. Presently the liner hovered, poised, sank, remained a little over 750 feet above the observatory on the roof-top.

"Cracowitz!" ejaculated the Master, into the 'phone again, as his deft fingers made another connection. A foreign voice answered: "Yes, sir!" alertly. "Ready in the lower gallery now, with the winch and tackles!" bade the Master.

Again came: "Yes, sir!" from the man in charge of the three who already knew perfectly well what was expected of them. As *Nissr* slowly turned, a trap opened in the bottom of her lower gallery, almost directly between the two forward vacuum-floats, and down sped a little landing *nacelle* or basket at the end of a fine steel cable.

Swiftly the electric winch dropped the *nacelle*, containing three men. It slowed, at their command through the 'phone that led up the wire. With hardly a jar, the basket landed on the roof.

The men jumped out, made fast their tackles to Captain Alden's plane there, leaped in again and signalled: "Hoist away!"

With noiseless speed the winch gathered in the cable. Up swooped the *nacelle*. As it cleared the roof, *Nissr* purred forward, slid away, gathered speed over the city where already the alarm had been given.

"Behold Now, I Come!"

IN four minutes the men had safely landed in the lower gallery once more, and the plane was being hoisted by davits and made fast on the upper platform, known as the take-off, which served as a runway for planes leaving the ship or alighting thereon.

Over the light-spangled city the giant air-liner gathered way. Three or four searchlights had already begun trying to pick her up. Quiverings of radiance reached out for her, felt into the void, whirled like cosmic spokes. The Brooklyn Navy Yard whipped the upper air for her. Down on Sandy Hook, a slim spear of light stabbed questingly through the night. Then all at once the monster light on Governor's Island caught her, dazzling into the Master's eyes.

He only smiled, as he sheered eastward, dropped East River behind and unloosed the air-eagle's course above Brooklyn.

"Just a little fireworks, as a send off, major," said he, notching the speed ahead, ever ahead, till a whipping gale began to beat in at the broken pane. "They got word of it pretty quick, eh? I suppose they'll send up a few 'planes after us."

"*After* us, yes!" exulted the major. "Faith, they'll be after us, all right—a devil of a long way after!"

To this the Master gave no answer, but signalled Auchincloss in the engine-room for full speed. Now a subtle tremor possessed the vast fabric, mistress of the upper spaces and the night. The close-compacted lights beneath commenced to sprinkle out into tenuous dots. The tiny blazing fringe of Coney burned a moment very far below, then slid away, under the glass flooring. Still heading sharply upward, with altimeter needle steadily mounting, with the cold becoming ever greater, the liner flung herself out boldly over the jet plain of ocean.

Right into the eye of heaven she seemed to point, as the Master snicked off the no-longer needed search-light, unleashed myriad stars—stars which leaped out of the velvet night. Already man and the works of man lay far behind. If there had been any tentative pursuit, the legionaries knew nothing of it. Outdistancing pursuit as an eagle distances sparrows, the liner gloried in her swift trajectory.

The Master nodded, well pleased. Bohannan laughed like a boy, and holstered his gun. He moved over to the starboard window, out of the gale. With mocking eyes he watched the futile search-light at the Hook.

"They've got as much chance of overhauling us as the proverbial celluloid cat has of catching the asbestos rat," said he. "A clean getaway, barring little damage we've taken—this window, and Alden, and——"

"Better unpack your kit, and settle down," the Master dryly interrupted him. "Take a look around and see that everything's shipshape. Be sure the port and starboard watches are chosen. Everything's been arranged, already, but in dealing with human beings there's bound

to be a little confusion. They aren't automata—unfortunately. And, major!"

"Yes, sir?" answered Bohannan, who despite his familiarity with the Master was now constrained to formality. Resentment sounded in his voice.

"Send Brodeur up here to relieve me, in about ten minutes."

"Yes, sir," repeated the Celt. For a moment, standing there in the gloom of the pilot-house, he eyed the dim, watchful figure at the wheel. Then he turned, slid the door and disappeared.

As he walked aft, past the aluminum ladder that led to the upper galleries, he muttered with dudgeon:

"He rates us two for a nickel, that's plain enough—plain as paint! Well, all right. I'll stand for it; but there may be others that——"

He left the words unfinished, and went about the Master's business.

Alone the Master smiled. Wine of victory pulsed in his blood and brain. Power lay under his hand, that closed with joy upon it. Power not only over this hardy Legion, but power in perspective over——

"God, if I can do it!" he whispered, and fell silent. His eyes rested on the instruments before him, their white dials glowing under the little pent-houses of their metal shields. Altitude now showed 2,437 feet, and still rising. Tachometers gave from 2,750 to 2,875 r. p. m. for the various propellers. Speed had gone above 190 miles per hour. No sign of man remained, save, very far below through a rift in the pale, moonlit waft of a cloud, a tiny light against a coal-black plain of sea—the light of a slow, crawling steamer—a light which almost at once droppped far behind.

Vast empty spaces on all hands, above, below, engulfed *Nissr*. The Master felt himself alone with air and sky, with power, with throbbing dreams and visions.

"If it can be done!" he repeated. "But—there's no 'if' to it, at all. It *can* be! It *shall!* The biggest thing ever attempted in this world! A dream that's never been dreamed, before! And if it can't, well, a dream like that is far more than worth dying for! A dream that can come true—by God, that shall come true!"

His hands tightened on the wheel. You would have said he was trying to infuse some of his own overflowing strength into the mechanism that, whirling, zooning with power, needed no more. The gleam in his eyes, there in the dark pilot-house, seemed almost that of a fanatic. His jaw hardened, his nostrils expanded.

This strange man's face was now wholly other than it had been only a week before, drawn and lined by ennui in Niss'rosh. Now vast ambitions dominated and infused it with virile force.

As he held the speeding airliner to her predetermined course through voids of night and mystery, he peered with burning eagerness at the beckoning stars along the world's far, eastern rim.

"Behold onw, Allah!" he cried suddenly. *"*"Labbayk!* I come!"

CHAPTER X

An Inquisition

THE arrival of Simonds, with the spare window pane, and of Brodeur—one of the boldest flyers out of Saloniki in the last months of the war—broke in upon the Master's reveries.. Only a few minutes were required to mend the window. During this time, the Master explained some unusual features of control to the Frenchman, then let him take charge of *Nissr*.

"She's wonderful," said he, as Brodeur settled himself at the wheel. "With her almost unlimited power, her impeccable controls and her automatic stabilizers, I hardly see what could happen to her."

"Fire, of course, m'sieur," the ace replied, "always has to be guarded against."

"Hardly on an all-metal liner. Now, here you see—and here——"

He finished his explanations, and, satisfied that all was safe, passed into his own cabin. Rrisa, he found, had already unpacked his kit, and had arranged it to perfection. Even a copper bowl of *khat*, the "flower of paradise," was awaiting him.

The Master sat down, chewed a few leaves and indulged in a little time of what the Arabs call *kayf*, or complete relaxation and of inner contemplation—a restful trick he had learned many years ago on the coasts of Yemen. The ticking of the aluminum-cased chronometer, now marking a little past two a. m., soothed him, as did the droning hum of the propellers, the piping whistle of the ship-made hurricane round the fuselage, the cradling swing and rock of the airliner hurling herself almost due east.

After some quarter-hour of absolute rest, he rang for his Arab orderly. Rrisa appeared at once. Already he had got himself into his military uniform, the one he had worn at Gallipoli when the Master had saved his life. As he stood there in the doorway, he swung his left foot out and back, with clicking heels, and made a smart salute.

"What does *m'almé* desire?" asked he, in Arabic.

"I desire to know the opinion of all this, Rrisa. Tell me, did thy great prophet, M'hámad, ever ride in such state through the air? Was Al Burak, his magic horse, on which he traveled to the Paradise of the houris, more swift or mighty than this steed of mine?"

The Master, speaking Arabic, weighted every word with its full meaning. "Tell me Rrisa, what of all this?"

"Your steed is very swift and very mighty. Your flying ship is very great," the Arab admitted. "But Allah and his Prophet are greater! *Allahu akbar!*" (Allah is greatest).

"Of course. But tell thou me, Rrisa, if I were to appear at Mecca in my *Nissr arib ela senia*—my eagle of the air—would not thy people give me great honors?"

"My head is at your feet, *m'almé*, and I am yours to do with as you will, even to the death, but I implore you, by the beard of the Prophet, do not do this thing!"

"And why not, Rrisa?"

"You and I, Master, are *akhawat*.* Therefore I can speak true words. You must not go to Mecca. No man of the Nasara may go there—and live."

"Thou meanest that if we go to Mecca and they capture us, they will kill us all?"

"Yea, Master. And I too shall die, for being with you, though I count that as less than nothing."

The Master kept a moment's silence, pondering; while, without, the voices of empty heaven whistled by, from strut and wire, brace and stay. The wild mystery of that outer night, excluded by the close-drawn curtains, contrasted strongly with the light, and warm comfort of the cabin with its snug berth, its

* *Labbayk* (I am here) is the cry of all Mohammedan pilgrims as they approach the holy city of Mecca.

* *Akhawat* signifies in Arabic the tie of sworn brotherhood between an Arab and one of different blood.

aluminum furniture, its shining walls where were affixed charts and maps, rules, photographs.

Under the clear, white light, Rrisa anxiously studied his Master's face. Great anxiety had begun to make itself manifest in the Arab's voice and in his eyes. Another troubled look came, too, as he glanced at the chronometer.

It struck, sharply. The Arab, contrary to all his habits and training, spoke first, without being spoken to.

"*M'almé* said he, timorously, "excuse the speech I offer without waiting. But I must ask. This is my hour of night-prayer, and I must bow to Mecca. Whither, from here, lies The City?"

The Master raised a hand, glanced at a compass set like a wrist-watch, peered a moment at one of the charts, and then nodded toward the door that led into the pilot-house.

Without delay, Rrisa faced that door and prostrated himself. The ancient cry: *"La illaha illa Allah. M'hamad rasual Allah!"* was raised there in the cabin of the rushing Eagle of the Sky—surely the strangest place where Moslem prayer was ever offered since first the Prophet's green banner unfurled itself upon the desert air of Araby.

Devoutly Rrisa prayed, then with a *"Bismillah!"* (in the name of Allah), arose and faced his master. The latter, wise in Eastern ways, remained gravely unsmiling. Never in all his dealings with the son of the East had he by word or look offended against Islam. There was, however, iron determination in his eyes as he demanded:

"Is it indeed true that in Mecca stands a building called the Ka'aba, also called *Beyt Ullah,* or Allah's House?"

A, m'almé, that is true," answered the Arab, with strange eyes.

"And it is indeed covered with a wondrous silken and gold cloth, every year renewed, known as the Kiswah?"

"Those words are true."

"All Moslems greatly revere the Ka'aba?"

"It is the center of their faith, Master."

"And thou hast seen it with thine own eyes?"

"With my own eyes, Master, for I am a *Hadji."** Attentively the Arab was now watching the Master. Slowly he continued: "Prayer, with face to Mecca, alms-giving, the keeping of the fast of Ramadan, and the pilgrimage to the Ka'aba, these are our law. Yea, Master, I have myself seen the Ka'aba, and more than once!"

"I Am the Master's!"

A CERTAIN trouble had now grown manifest in Rrisa's eyes. His lips moved silently, as if still praying; but no words were audible. The Master pondered a moment more, then demanded:

"Is it true there is a sacred Black Stone in the walls of the Ka'aba, precious to all followers of the Prophet, from Africa to China and to the farthest isles? Revered by all the two hundred and thirty million of your faith?"

"That is true, Master. I myself have touched and kissed the Black Stone."

"Mecca, the Ka'aba and the Black Stone are forbidden to all heretics?" relentlessly pursued the Master.

"Wallah! Yea, so they are to—all who are not of Islam," Rrisa tried to soften the answer.

"They tell me," persisted Master, "the Black Stone is in the western wall of the Ka'aba, about seven feet from the pavement.

"That is a lie!" flared Rrisa, with indignation. "It is in the northeast corner, at the very corner, *m'almé.* It is between four feet and five from the ground. That, and no other, is the true place of the *Hajar!"* (Black Stone).

"Ah, yes, yes, the books lie," agreed the Master. "And they say, too, that certain of the Ferringhi have indeed touched and even kissed the Black Stone, and still lived."

Rrisa's face clouded. It burned coppery, with a flush of hot blood under that dark skin. By the clear white light in the cabin, the Master closely observed him. Idly he broke off a leaf of the *khat,* and nibbled at it.

"Is that the truth?" he inquired, pitilessly.

"I must speak truth to you, *m'almé,"* confessed the Arab, with bitter shame. "Two of the Ferringhi—Nasara men like yourself—have indeed touched and kissed it. Two that we know of. *Shaytan el Kabir* (the Great Devil) may have permitted others to do that, but we know of only two who have done it—and lived."

"Thou meanest one named Burckhardt, and Sir Richard Burton?"

The Arab shuddered at sound of those names, and silently nodded. Then he burst out:

"Those were their names, Master! Those two, disguised as *Hadji,* defiled the Black Stone, which was given by Allah to the first Arabs; and they both escaped. But many others who have tried—"

"Have died at the hands of thy people?"

"Bismillah! Yea!" A flash of pride irradiated the dark face of Rrisa. His figure drew itself erect. Beneath the veneer of civilization with which life among the Ferringhi had overlaid him, the Master sensed the wild, fierce, free soul of this desert man, to whom the death of the unbelieving dog is sweet.

"It is well," nodded the Master. Then, suddenly he stood up, faced the Arab, and bent on him a sternly penetrant look.

"Rrisa," said he, impressively, his voice slow, grave, sonorous, "only for me thy bones would to-day be mouldering in the trenches at Gallipoli or maybe rotting in a Turkish grave. The life that is in thee belongs to me! That is thy ancient law. Is it not true?"

"It is true, Master. *Nahnu malihin."* (We have eaten salt together.)

"And the salt is still in thy stomach?"*

"Yea, Master. You are still *dakhil* (protected) to me."

"Thou art mine to do with as I will?"

"I am the Master's!"

"Treason to me, Rrisa, is treason to thy holy laws. Surely, such treason would plunge thy soul far into the depths of Eblis. When thy time comes to walk across the burning pit, on the bridge as fine and sharp as the edge of a scimitar, if it be laden with treachery to one who has saved thy life and whose salt thou hast eaten, surely it shall not pass over, but shall fall. Far into the deeps of Jehannum it shall fall, where the Prophet says: 'Stones and men shall be the fuel of the everlasting flame!'"

"I am the Master's," repeated Rrisa, with trembling

* Title among the Arabs and Moslems in general for one who has performed the pilgrimage to Mecca.

* Some Arab tribes hold that the salt binds protection for only twenty-four hours and at the end of that time must be renewed, otherwise it is "not in their stomachs."

mouth. He raised his hand to forehead, lips and heart. "My head is at the Master's feet!"

"Forget that not, thou!" cried the Master, dominantly. *"Ruch'halla!"* (Now go!)

CHAPTER XI

A Stowaway

HARDLY had the trembling Arab salaamed and departed in terror of soul, knowing not what fearful events might be impending, when Bohannan appeared. The smile on the Master's lips, the sternly calculating expression in his eyes, faded into something as near astonishment as this strange man ever felt, when the major exclaimed:

"Well, faith now, what d'you think? The most improbable thing you can imagine!"

"What may that be, major?"

"It's not that it may be, it's what it *is* that's astonishing me. We've got a stowaway aboard us!"

"Stowaway? Impossible!"

"True, nevertheless. Manderson has just now routed him out of the starboard storage-room, near the reserve petrol-tank."

"Hm! Who is he?"

Bohannan shrugged stout shoulders.

"Don't know yet. He's still dopy. Just coming out of the effects of the lethalizing gas."

"Ah, yes, yes, I see. One of the former crew, I suppose. This is quite inexcusable. That a man should have been overlooked and left aboard—it won't do, major. Kloof was responsible for that room. Kloof will have to suffer. Any other news?"

"Travers, the New Zealander, is wounded."

"Badly?"

"I'm afraid he's hard hit, sir."

"Well, I'll have a look at him and at this stowaway. Where are they, now?"

"In the lazaret, I suppose you call it. Though what a hospital is, aboard an air liner, blest if *I* know!"

"Sick-bay, we'll call it. Problems arising already. A stowaway—rather odd, I must say. Still, as a problem, it's not hard to solve. Nothing simpler than dropping a man overboard."

"You—surely, you wouldn't do that!" ejaculated the major, startled. His rubicund face grew round with amazement.

"That remains to be seen. Come, let's have a look at him!"

Together they went out into the brightly-lighted main corridor, near the ladder to the upper gallery, turned to the right and walked aft. A door, just a little abaft the chart-room door, opposite the Master's cabin, gave a glimpse of the as yet unoccupied smoke-room. Astern of this, they passed the dining-saloon with its long table and its swivel-chairs. Beyond several stateroom doors they came to the transverse corridor at the other side of which, directly facing the main corridor, the engine-room door opened.

Entering the engine-room, they found themselves in a bright-lighted compartment fifteen feet wide by twenty-six feet seven inches long. This compartment contained six Norcross-Brail engines, each capable of developing 1150 H.P. The engines were in charge of Auchincloss and two assistant engineers, who had all six filling the room with a drowsy drone, like ten billion bees humming themselves to sleep in some mysterious hive.

So nicely adjusted was every part, so accurately true was every shaft, bearing, gear, that practically no vibration could be noted. The voice, in ordinary tones, carried perfectly; and yet in that small space nearly 7,000 H.P. were being produced and transmitted to the propellers and to the storage batteries that operated helicopters and compressed-air system, as well as to the lighting-plan of the air-liner.

As the two men entered the engine-room, the Master nodded to Auchincloss. He stood a moment peering at the bright-flecked metal of the engines, the gleaming walls—hollow and filled with non-inflammable helium gas of great lifting power—the men on watch over all this splendid mechanism. Then he passed between engines No. 4 and No. 5, toward the aft wall of the compartment.

Four doors opened in the bulkhead, there. Two communicated with store-rooms, one opened into the passage that led to the aft observation pit, the fourth gave access to the sick-bay. This door the Master slid back. Followed by the major he passed through.

A small but fully-equipped hospital met their eyes. Cots, operating-table, instrument-cases, sterilizers, everything was complete. Immaculate cleanliness reigned. On two of the cots, men were lying.

Beyond, Captain Alden—still fully dressed—was sitting on a white metal chair. The captain's face was still concealed by the celluloid mask, but a profound pallor was visible on the lower portion of his right cheek and along his jaw. The set of that jaw showed an invincible obstinacy that bespoke rebellion.

Dr. Lombardo, a dark-skinned Florentine, who had been talking with the captain, turned at the master's entrance into the sick-bay. Already Lombardo had put on a white linen jacket. Though he had not yet had time to change his trousers, he still presented a semi-professional air as he advanced to meet the new-comers.

"I'm glad you're here, sir," said he to the Master. "There's trouble enough, already."

"Stowaway?" queried the Master, advancing to the nearer cot.

"Yes, sir. Perhaps not voluntarily so. You know how he was found."

"Such oversight is inexcusable!" The Master leaned down, and shook the man by the shoulder. "Come, now!" he demanded. "What's your name?" Curiously he peered at the stranger, a man of great strength, with long arms and powerful, prehensile hands that reminded one of an ape's.

"It's no use questioning him, sir," put in Lombardo, while the major peered curiously at Alden and at the other cot where a man was lying with a froth of bright, arterial blood on his lips. Though this man was suffering torment, no groan escaped him. A kind of gray shadow had settled about eyes and mouth—the shadow of the death angel's wings.

"It's no use, sir," repeated the doctor. "He hasn't recovered consciousness enough, yet, to be questioned. When he does, I'll report."

"Do so!" returned the Master, curtly. "I hardly think we need use much ceremony in disposing of him." He turned to the other cot. "Well, sir, how about this man?"

"I'm—all right, sir," weakly coughed the wounded New Zealander. He tried to bring a hand to his forehead, but could hardly lift it from the sheet. The doctor, with compressed lips, slightly shook a negativing head as the Master raised interrogative brows.

"Serious," Lombardo whispered. "Shot through the right lung. Bullet still there. Severe internal hemorrhage. I may be able to operate, with Daimamoto assisting, but only in case the patient rallies. We really need

a nurse, on this expedition. Medically speaking, we're short handed. However, I'll do my best, sir."

Captain Alden Stands Revealed

I KNOW you will," answered the Master. He stood a moment gazing down at the New Zealander, with stern face and tight mouth. This man on the cot had already given much for the expedition, and might give all. Not without blood and suffering—death, perhaps—was the Master's dream to come to its fruition. After a moment, the Master turned away. He faced Captain Alden.

"Your wound not yet dressed?" demanded he.

"No, sir, not yet."

"And why not, pray?"

"He's simply refused all attention, whatever!" put in the doctor.

"I have a reason, sir," Alden proffered.

"No reason can overrule my orders!" the Master exclaimed. "I commanded you to report to Dr. Lombardo for treatment."

"Nevertheless, sir, I refuse—"

"Insubordination will not be condoned, sir!"

"My reason is valid. When you have heard it, you will understand."

"State your reason, sir!"

"I decline—here."

For a long moment the eyes of the Master met those of Captain Alden, that strangely peered out at him through the eye-holes of the pink, celluloid mask. Bohannan and the doctor stood by, curiously observing this conflict of two wills. Silence came, save for the droning purr of the engines, the buffeting gusts of wind along the fuselage, the slight trembling of the gigantic fabric as it hurled itself eastward through the high air of night.

"This is inexcusable," said the Master, crisply. "I give you one last chance. Either permit treatment, or consider yourself under arrest."

"Before you proceed to such lengths," the captain replied. "I ask one favor of you."

"What favor?"

"Two minutes alone with you, sir."

"Come with me!"

The Master turned and left the sick-bay. Alden arose, weakly enough, and followed him. As the door opened and closed again, the engines hummed louder, then sank again to their dull murmur. Bohannan remained with the doctor.

"Well, faith, can you beat that?" exclaimed the major. "There's an Ethiopian in the woodpile, sure enough. Something strange, here, I'm thinking! Something damned strange, here!"

"Is there anything here that *isn't?*" asked Lombardo, with an odd laugh, as he turned back to the cot where lay the dying New Zealander.

Alone in his cabin with Captain Alden, the Master faced the insubordinate member of his crew with an expression of hard implacability. The captain stood there, determinedly confronting him. His right hand held to the table for support. His left sleeve was sodden with blood; the left arm, thrust into the breast of his coat, was obviously numbed, paralyzed.

"Well, sir, what have you to say for yourself?" coldly demanded the Master.

"I repeat that I cannot—and will not—submit myself to any medical attention from any member of this expedition."

"This is dangerous ground you're treading!" the Master exclaimed. His voice had deepened, grown ominous. "You understood perfectly well the conditions of the undertaking—unquestioning obedience to my orders, with life-and-death powers in my hands, to punish insubordination."

"I understood all that, sir," answered the captain. "I understand it now. Nevertheless, I repeat my refusal to obey."

"By Allah! There must be some deep cause here!" ejaculated the Master, his eyes smoldering. "I intend to work my will, but I am a man of reason. You are entitled to a hearing. State your objection, sir. Speak up!"

The captain's answer was to raise his right hand and to loosen the cords securing the celluloid mask. As the Master peered, steadying his nerves against the shock of what he felt must be a nameless horror, underneath, Alden tore away the mask and threw it upon the table.

"Here is my reason, sir," said he very quietly, "for not permitting Lombardo, or any other man here, to dress my wound."

"Good God!" exclaimed the Master, shaken clean out of his aplomb. The shock he had expected had come to him, but in far other guise than he had counted on. With clenched fists and widening eyes he peered at Alden.

The face he now suddenly beheld, under the clear white light of the cabin, was not the hideous, mangled wreck of humanity—the Kaiser's masterpiece—he had expected to see.

No—far, and very far from that!

It was the face of a woman. One of the most beautiful women his eyes had ever rested on.

CHAPTER XII

The Woman of Adventure

A MOMENT'S utter silence followed. The woman, with another gesture, drew off the aviator's cap she had kept; she pulled away the tight-fitting toupee that had been drawn over her head and that had masked her hair under its masculine disguise. With deft fingers she shook out the masses of that hair—fine, dark masses that flowed down over her shoulders in streams of silken glory.

"Now you see me as I am!" said she, her voice low and just a little trembling, but wholly brave. "Now, perhaps, you understand!"

"I—but you—" stammered the Master, for the first time in all his life completely at a loss, dazed, staggered.

"Now you understand why I couldn't—wouldn't—let Dr. Lombardo dress my wound."

"By the power of Allah! What does all this mean?" The Master's voice had grown hoarse, unsteady. "A woman—*here*—!"

"Yes, a woman! The woman your expedition needs and must have, if death and sickness happen, as happen they will. The woman you would never have allowed to come—the woman who determined to come at all hazards, even death itself. The woman who—"

"But, Lord Almighty! Your papers! Your decorations!"

"Quite genuine," she answered, smiling at him with dark eyes, unafraid. Through all his dazed astonishment he saw the wonder of those eyes, the perfect oval of that face, the warm, rich tints of her skin even though overspread with the pallor of suffering.

"Madam," said he, trying to rally, "this is past all words. No explanation can make amends for such deception. Still, the secret is yet yours—and mine. Until

I decide what to do, it must be respected."

Past her he walked, to the door, and snapped the catch. She, turning, leaned against the table and smiled. He saw the gleam of perfect teeth. A strange figure she made, with loose hair cascading over her coat, with knickers and puttees, with wounded arm slung in the breast of the jacket.

"Thank you for your consideration," she smiled. "It is on a par with my conception of your character."

"Pray spare me your comments," he replied, coldly. He returned to his desk, but did not sit down there. Against it he leaned, crossed his arms, and with somewhat lowered head peered at her. "Your explanation, madam?"

"My papers are *en règle*," said she. "My decorations are genuine. Numbers of women went through the great war as men. I am one of them, that is all. Many were never discovered. Those who were owed it to wounds that brought them under observation. Had I not been wounded, you would never have known. I could have exercised my skill as a nurse, without the fact of my sex becoming apparent.

"That was what I was hoping for and counting on. I wanted to serve this expedition both as a flyer and as a nurse. Fate willed otherwise. A chance bullet intervened. You know the truth. But I feel confident, already, that my secret is safe with you."

The light on her forehead, still a little ridged and reddened by the pressure of the edge of the mask, showed it broad, high, intelligent. Her eyes were deep and eager wit ha kind of burning determination. The hand she had rested on the table, at her right side, clenched with the intensity of her appeal:

"Let me stay! Let me serve you all! I ask no more of life than that!"

The Master, knotting together the loose threads of his emotion, came a step nearer.

"Your name, madam!" he demanded.

"I cannot tell you. I am Captain Alfred Alden, to you, still. Just that. Nothing more."

"You continue insubordinate? Do you know, madam, that for this I could order you bound hand and foot, have you laid on the trap in the lower gallery, and command the trap to be sprung?"

His face grew hard, deep-lined, almost savage as he confronted her—the only being who now dared stand against his will. She smiled oddly, as she answered:

"I know all that, perfectly well. And I know the open Atlantic lies a mile or two below us, in the empty night. Nevertheless, you shall not learn my name. All I shall tell you is this—that I am really an aviator. 'Aviatrix' I despise. I served as 'Captain Alden' for eight months on the Italian front and twenty-one months on the western. I am an ace. And—"

"Never mind about all that!" the Master interrupted, raising his hand. "You are a woman! You are here under false colors. You gained admission to this Legion by means of false statements—"

"Ah, no, pardon me! Did I ever claim to be a man?"

"The impression you gave was false, and was calculated to be so. This is mere quibbling. A lie can be acted more effectively than spoken. All things considered, your life—"

"Is forfeited, of course. I understand that, perfectly well. And that means two things, as direct corollaries. First, that you lose a trained flyer and a woman with Red Cross training; a woman you may sorely need before this expedition is done. Second, you deny a human being who is just as eager as you are for life and the spice of adventure, just as hungry for excitement as you or any man here—you deny me all this, everything, just because a stupid accident of birth made me a woman!"

The Master Inflexible

HER clenched right first struck the table passionately, at her side. "A man's world! That's what this world is called; that's what it is! And you—of all men—are living down to that idea! You—*the Master!*"

The man's face changed color. It grew a little pale, with deepening lines. He passed a hand over his forehead, a hand that for the first time trembled with indecision. His strong teeth gnawed at his lower lip. Never before had he lacked words, but now he found none.

The woman exclaimed, her voice incisive, eager, her eyes burning:

"It is because you *are* a master of men, and of yourself, that I have taken this chance! It is because I have heard of your absolute sense of justice and fair play, your appreciation of unswerving loyalty and of the heart that dares! Now you understand. I have only one more thing to say."

"And what is that?"

"If you respect my secret and let me go with you on this great enterprise, no man aboard the Eagle of the Sky will serve you any more loyally than I. No man will venture more, endure more, suffer more—if suffering has to be. I give you my word of honor on that, as a fighter and—a woman!"

"Your word of honor as—"

"A woman! Do you understand?"

Silence again. Their eyes met. The Master's were first to lower.

"Your life is spared," he answered. "That is a concession to your sex, madam. Had you been a man, I would inevitably have put you to death. As it is, you shall live. And you shall remain with us—"

"Thank God for that!"

"Till we reach land. There you must leave the *Nissr*."

"I shall not leave it alive," the woman declared, her eyes showing dilated pupils of resentment of anger. "I haven't come this far to be thrown aside like a bit of worthless gear!"

"You and your machine will be cast off, over the first land we touch," the Master repeated doggedly. "Whatever information you may give, cannot injure us, and—"

"Stop! Not another word like that, to me!"

Her eyes were blazing now; her right fist quivered in air.

"You accuse me of treason," she cried. "Oh, what injustice, what—"

"I accuse you of nothing, save of having deceived us all, and of being very much *déplacée*, here. The deception shall continue, as far as the others are concerned. You came to us, as a man. You shall go as one. Your secret shall be respected by me. But understand one thing clearly."

"What is that?" she demanded, still trembling with indignation.

"The fact that you are a woman has no weight with me, so far as your persuading me to let you remain of the party may be concerned. Women have never counted in my life. Their wiles, arts, graces, tears, mean nothing to me. Their entreaties seem futile. Their arguments appear like trivial puerilities.

"Other men are sometimes influenced by such. I tell you now, madam, I shall not be. Your entreaties will

have no weight. When the time comes for you to leave the *Nissr* I trust you will go quietly, with no distressing scene."

A certain grimness showed in the woman's face, making it sternly heroic as the face of Medtaor Zenobia. She answered:

"Do you think me the type that entreats, that sheds tears, that exercises wiles?"

"We won't discuss your personality, madam! This interview is drawing to an end. Until we reach land, nothing can be done. Nothing, but to look out for your injury. Common humanity demands that your wound be dressed. Is it a serious hurt?"

"Not compared with the hurt you are inflicting, in banishing me from the Flying Legion!"

"Come, madam, refrain from extravagant speeches! What is your wound?"

"A clean shot through the left arm, I think, a little below the shoulder."

"I realize, of course, that to have Dr. Lombardo dress it would reveal your sex. Could you in any way manage the dressing, yourself?"

"If given antiseptics and bandages, yes."

"They shall be furnished, also a stateroom."

"That will excite comment."

"It may," the Master answered, "but there is no other way. I will manage everything privately, myself. Then I will let it transpire that there was some injury to the face, as well, and that the mask had to be removed. I can let the impression get about that you refused to allow any one but me see your mutilated face.

"I can also hint that I have helped you with the dressing, and have ordered you to keep your stateroom for a while. When it comes time to leave *Nissr*, I will dispatch you as a messenger. Thus your secret will remain intact. Besides, no one will dare inquire into anything. No one ventures to discuss or question any decision of mine."

Something of hard arrogance sounded in the Master's voice. The woman thanked him, her eyes penetrant, keenly intelligent, even a trifle mocking. One would have said she was weighing this strange man in the balance of judgment, was finding him of sterling stuff, yet was perhaps cherishing a hope, not untinged with malice, that some day a turn of fate might humble him. The Master seemed to sense a little of this, and took a milder tone.

"I must compliment you on one thing, madam," said he, with just the wraith of a smile. "Your acting has been perfection itself. And the fortitude with which you have borne the discomfort of that mask for more than a week, to achieve your ends, cannot be too highly praised."

"Thank you," she replied. "I would have stood *that* a year, to be one of your Legion! But now—tell me! Isn't there any possibility of your reversing your decision?"

"None, madam."

"Isn't there anything I can say or do to—"

"Remember, you told me just a minute ago you were not the type of woman who entreats!"

CHAPTER XIII

The Enmeshing of the Master

SHE fell silent, biting her full lip. Something in her eyes shamed the man. Not for all his inflexible sternness could he feel that he had come out a winner in this, their first encounter. A woman—one of the despised, ignored creatures—had deceived him. She had disobeyed his orders. She had flatly thrown down the gage of battle to him, that she would never leave *Nissr* alive. And last, she had forced him into planning to disseminate falsehoods among his crew—falsehoods the secret of which only she shared with him.

Unwilling as this man was to have anything in common with her, he had been obliged to have something in common—to have much. Something existed; a bond, even if an unpleasant one, had already stretched itself between these two—the first secret this man had ever shared with any woman.

"Captain Alden" smiled a little. The honors of war, so far, lay all in her camp.

The Master feeling this to the inner marrows, humiliated, shaken, yet through it all not quite able to suppress a kind of grudging and unwilling tribute of admiration, sought to conceal his perturbation with a stern command:

"Now, madam, I will call my orderly and have you escorted to a stateroom; have you provided with everything needful for your injury. I trust it is not causing you any severe pain?"

"Pray don't waste any time or thought on any injury of mine, sir!" the woman returned.

"Very well, madam! Resume your disguise!"

She tried to sweep up her magnificent hair and secure it upon her head. But with only one hand available this proved impossible. They both saw there was no way for her to put on the toupee again.

She smiled oddly, with a half-whimsical, wholly feminine bit of malice. Her eyes seemed dancing.

"I'm afraid I can't obey you, sir," she proffered. "You can see for yourself, it can't be done."

A dull, angry flush crept up over the Master's rather pale face, and lost itself in the roots of his thick, black hair. Perfectly well he saw that he was being cornered in an untenable position of half-command, half-intimacy. Without apparently exercising any wiles, this woman was none the less involving him in bonds like those the Lilliputians threw round sleeping Gulliver.

Anger welled up in his proud heart that any one—much less a woman—should thus lower his dignity. But still his manhood dictated courtesy. He came a few steps nearer, and said:

"I must admit this seems rather an embarrassing situation. Frankly, it does not tend to ameliorate the relation between us. You have placed yourself—and me—in a peculiarly compromising position. I must try to meet it.

"Obviously, you cannot expect one so unskilled as I, in things feminine, to help you in the capacity of lady's maid. Therefore only one thing remains to do. Instead of calling my orderly, and having him show you your stateroom, I must in some way arrange to get you there, myself."

"That's kind of you I'm sure," she answered, half in mockery, half gratitude.

"There I will supply you with medical supplies. In some manner or other you can manage to do up your hair and resume your disguise. You will remain in your stateroom—under arrest—until such time as you are cast loose, to-morrow, in your 'plane."

"To-morrow?"

"I should say, sometime before night of the day that has already begun. Food and drink will be brought you, of course."

"That's very good of you, sir." Her smile tantalized. The curt laconicism of her manner, in the masculine rôle, had changed to the softer ways of womankind.

Despite himself, the Master was constrained to admire her ability as an actress.

"Of course you realize," she continued, "that to cast me loose in a 'plane, with only one serviceable arm, will be equivalent to committing cold-blooded murder."

"A mere detail!"

"A mere detail—to murder a woman?"

"Pardon me, you misunderstand. I mean, the manner in which you are to leave *Nissr* matters little so long as you leave. I will see that you are safely landed. That no harm arrives to you.

"But you—shall not remain with us. Now, kindly stay here. Lock the cabin door after I have gone, and admit no one until I return. I will signal you with two triple knocks, thus."

He illustrated the knocks, on the table, and, unlocking the door, left the cabin in a black humor. The sound of the woman locking the door after him, the knowledge that he had been obliged to make up a little code for readmission, angered him as he had rarely been angered.

Self-protection demanded these subterfuges, however. To let the secret escape, and to be obliged to admit having been deceived by a woman, would fatally lower his prestige with the legionaries. How could he, if known to be the dupe of a woman, command those hard, bold men?

Humiliated, yet in his heart thankful that no one had yet penetrated the secret—as Dr. Lombardo might easily have done, had he laid forcible hands on "Captain Alden"—he set about the necessary task of himself preparing a stateroom and providing the necessary medical supplies. Lombardo asked no questions. His eyes, however, had grown quizzical. No one else seemed to notice what the Master was about. Each was busy in his own place, at his own task.

Twenty minutes had passed before all was ready and the Master could return to his cabin. He rapped as agreed, and was admitted, feeling his cheeks burn at even the analogy between this clandestine entrance and some vulgar liaison—a thing he had all his life scrupulously avoided.

"Come!" he directed. She followed him. Silently he ushed her into her appointed place. No one had seen them. He followed her into the little stateroom, closed the door, folded his arms and confronted her with a grim face.

"Before leaving you, madam," said he, "I wish to repeat that only your sex has saved you from summary execution. You are guilty of high crimes and misdemeanors, in the code of this expedition—guilty of falsehood and deception that might have introduced fatal complications into my most carefully evolved plan.

"Nevertheless, my code as an officer prohibits any punishment other than this merely nominal arrest. I must offer you temporary hospitality. Moreover, if you need any assistance in dressing your wound, I will give it. Common humanity demands that."

"I don't need anything, thank you," she answered. "I don't ask for anything, but to stay with the Legion."

"That's a point I must positively decline to argue, madam," he informed her, shaking his head. "Well, since there is nothing more to say, I wish you a very good night!"

Bowing, he left the stateroom. He heard the door-catch snap. Somehow, in some way as yet inexplicable to him, that sound caused him another discomfort. For the first time in his life he had been having a little conversation with a woman—conversation that might almost have been construed as intimate, since it had held secrets. For the first time he had felt himself outwitted by a woman, beaten, made mock of. Now he was being shut away from her.

Capture or Kill

INWARDLY raging as he was, hot, confused, unhorsed, still a strange, fingering insinuation of something agreeable had begun to waken in him. The Master, not understanding it at all, or being able to analyze sensations so foreign to all his previous thought and experience, cut the Gordian knot of puzzlement by roundly cursing himself, by Allah and the Prophet's beard, as a fool. And with a vastly disturbed mind he returned along the white, gleaming corridor—that dipped and swayed with the swift rush of *Nissr*—back to his own cabin.

There he found the buzzer of his little desk-telephone intermittently calling him.

"Yes, hello?" he answered, receiver at ear, as he sat down in the swivel-chair of aluminum with its hydrogen cushion.

The voice of the wireless man, Menendez, reached him. In a soft, Spanish-accented kind of drawl, Menendez said:

"Just picked up two important radios, sir."

"Well? What are they?"

"International Air Board Headquarters, in Washington, has been notified of our getaway. They have sent out calls for all air-stations in both America and Europe to put up scout-squadrons to watch for us."

"What else?"

"Two squadrons have been started westward across the Atlantic, already, to capture or destroy us."

"Indeed? Where from?" The Master spoke coldly. This information, far from seeming important to him as it had to Menendez, appeared the veriest commonplace. It was nothing but what he had expected and foreseen. He smiled grimly as he listened to the radio man's answer:

"One squadron has started from Queenstown. The other from the Azores—from St. Michaels."

"Anything else?"

"Well, sir, now and then I can get a few words they're sending from 'plane to 'plane—or from 'plane to headquarters. They mean business. It's capture or kill. They're rating us as pirates."

"Very well. I mean, anything important?"

"Nothing else, sir."

"Keep me informed, if any real news comes in. But don't disturb me with trifles!"

The Master hung up the receiver, sat back in his chair and stretched his long, powerful legs under the desk. He set both elbows on the arms of the chair, joined his finger-tips and sank his lips upon them

"I'd better be rigging that vibratory apparatus before long," he reflected. "But still, there's no immediate hurry. Time enough for all that. Lots of time."

His thoughts wandered from *Nissr* and the great adventure, from the coming attackers, from the vibratory apparatus, yes from the goal of all this undertaking itself, back to "Captain Alden." The *who* and *why*, the *whence* and *whither* of this strange woman urgently intruded on his mind; nor by any effort of the will could he exclude these thoughts.

For a long time, while *Nissr* roared away eastward, ever eastward into the night, he sat there, sunk in a profound revery.

"A woman," he whispered, finally, the words lingering on his lips. "A woman, eh? Strange—very strange!"

Resolutely he forced himself to consider the plans he had laid out; his success thus far; the means he meant to take with the attacking squadrons; the consummation of his whole campaign so vast, so overpowering in its scope.

But through it all, persisted other thoughts. And these, he found, he could not put away.

The buzzer of the desk-telephone again recalled him to himself. "Hello, hello?"

"I have to report that a third squadron has been ordered into the air, from Monrovia," announced Menendez.

"Very well! Anything else?"

"No, sir."

The Master hung up the receiver, arose, and seemed to shake himself from the kind of torpor into which his thoughts of the woman had plunged him.

"Enough of this nonsense!" growled he. "There's work to be done—*work!*"

With fresh energy he flung himself into the task of planning how to meet and to repel the three air-fleets now already on the westward wing to capture or annihilate the Flying Legion.

CHAPTER XIV

Storm Birds

THE first slow light of day, "under the opening eyelids of the morn," found the Master up in the screened observation-gallery at the tip of the starboard aileron. Here was mounted one of the six machine-guns that comprised *Nissr's* heavier armament; and here, too, were hung a dozen of the wonderful life-preservers — combination anti-gravity turbines and vacuum-belt, each containing a signal-light, a water-distiller and condensed foods—that, invented by Brixton Hewes just after the close of the war, had done so much to make air-travel safe.

Major Bohannan was with the Master. Both men, now in uniform, showed little effect of the sleepless night they had passed. Wine of excitement and stern duties to perform, joined with powerful bodies, made sleeplessness and labor trivialities.

For an hour the two had been standing there, wrapped in their long military overcoats, while *Nissr* had swooped on her appointed ways, with hurtling trajectory that had cleft the dark. Somewhat warmed by piped exhaust-gases though the glass-enclosed gallery had been, still the cold had been marked; for without, in the stupendous gulf of emptiness that had been rushing away beneath and all about them, no doubt the thermometer would have sunk close to zero.

Nissr's altitude was now very great, ranging between 17,500 and 21,000 feet, so as to take advantage of the steady eastward-setting wind in the higher air-lanes. A hard, frozen moonlight, from the steely disk sinking down the western sky, had slashed ink black shadows of struts and stanchions across the gallery, and had flung *Nissr's* larger shadow down the hungering abysses of the sky that had yawned beneath.

That shadow had danced and quivered at fantastic speed across dazzling moonlit fields of cloud, ever keeping pace with the Sky Eagle, now leaping across immense and silent drifts of white, now plunging vanishing into black abysses that showed the ocean spinning backward, ever backward toward the west.

With the coming of dawn, the shadow had faded, and the watchers' eyes had been turned ahead for some first sight of the outriders of the attacking fleets. Bohannan, a little nervous in spite of his well-seasoned fighting blood, had smoked a couple of sigars in the sheltered gallery, pacing up and down with coat-collar about his ears and with hands thrust deep in pockets. The Master, likewise muffled, had refused all proffers of tobacco and had contented himself with a few *khat*-leaves.

Silence had, for the most part, reigned between them. Up here in the gallery, conversation was not easy. The hurricane of *Nissr's* flight shrieked at times with shrill stridor and with whistlings as of a million witches bound for some infernal Sabbath on the Matterhorn. A good deal of vibration and of shuddering whipped the wing-tip, too; all was different, here, from the calm warmth, comfort, and security of the fuselage.

The men seemed standing on the very pinion-feathers of some fabled roc, sweeping through space. Above, below, complete and overwhelming vacancy clutched for them. The human is not yet made who can stand thus upon the tip of such a plane, and feel himself wholly at ease.

As darkness faded, however, and as approaching dawn began to burn its slow way up the stupendous vaults of space above the eastern cloud-battlements—battlements flicked with dull crimson, blood-tinged blotches, golden streaks and a whole phantasmagoria of shifting hues—something of the oppression of night fell from the two men.

"Well, we're still carrying on. Things are still going pretty much O.K., sir," proffered the major, squinting into the East—the cold, red East, infinitely vast, empty, ripe with possibilities. "A good start! Close to a thousand miles we've made; engines running to a hair; men all fitting into the jobs like clockwork. Everything all right to a dot, eh?"

The Master nodded silently, keeping dark eyes fixed on the horizon of cloud-rack. Above, the last faint prickings of stars were fading. The moon had paled to a ghostly circle. Shuddering, *Nissr* fled, with vapory horizons seemingly on her own level so that she appeared at the bottom of an infinite bowl. Bohannan, feeling need of speech, tried to be casual as he added:

"I don't feel sleepy. Do you? Seems like I'd never want to sleep again. Faith, this *is* living! You've got us all enthused. And your idea of putting every man-jack in uniform was bully! Nothing like uniforms—even a jumble of different kinds, like ours—to cement men together and give them the *esprit de corps*. If we go through as we've begun—"

The Master interrupted him with a cold glance of annoyance. The Celt's exuberance jarred on his soul. Since the affair with "Captain Alden," the Master's nerves had gone a little raw.

Bohannan rallied bravely.

"Of course," he went on, "it was unfortunate about that New Zealand chap going west. He looked like a right good fellow. But, well—*c'est la guerre!* And I know he wouldn't have chosen a finer grave than the bottom of the Atlantic, where he's sleeping now.

"By the way, how did Alden come out? Much hurt, was he? I know, of course, he didn't go back to the sick-bay. So he couldn't have been badly wounded, or he would be—"

"The Arabs have a saying, my dear fellow," dryly answered the Master, "that one ear is worth ten thousand tongues. Ponder it well!"

The major's look of astonishment annoyed the Master, even while it hurt him. He took scant pleasure in rebuffing this old friend; but certainly "Captain Alden" would not bear discussing. Feeling himself in a kind of impasse, regarding Alden, and fearing some

telltale expression in his eyes, the Master swung up his binoculars and once more swept the cloud-horizons from north-east to south-east.

"We ought to be sighting some of the attackers, before long," judged he. "I'm rather curious to see them—to see flies attacking an eagle. I haven't had a real chance of testing out the neutralizers. Their operation, in actual practice, ought to be interesting."

He tried to speak coldly, impersonally; but he well realized a certain strained quality in his voice. Even now, in the hour of impending attack, his thoughts could not remain wholly fixed on the enemy which—so the wireless informed him—lay only a little beyond the haze-enshrouded, burning ruin of cloudland.

The Enemy Sighted

DESPITE every effort of the will, he kept mentally reverting to the midships port stateroom containing the woman. He could not keep himself from wondering how she was getting on. Her wound, he hoped—he felt confident—could not be serious.

Had it been, of course the woman would have asked some further aid. And since the moment when he had left her, no word had come to him. More than once, temptation had whispered: "Go to her! She has deceived you, and you are master here. But, above all, you are a man!"

Twice he had all but yielded to this inner voice. But he had not yielded. Another and a sterner voice had said: "She is an interloper. She has no rights. Why give her another thought?"

This voice had prevailed. The Master had told himself only a few hours more remained, at all events, before the woman should be cast off and abandoned in whatever strange land might befall—probably Morocco, or it might be the Spanish colony of Rio de Oro on the western fringes of the Sahara. After that, what responsibility for her safety or her welfare would be his? Why, he had none, even now!

"But, man," the small voice insinuated, "she came to you on an errand of mercy, to nurse and care for such as might fall ill or be wounded. It was not wholly the desire for adventure that led her to deceive you. Her motive was high and fine!"

"A curse on all women!" retorted the other voice. "Away with her!" And this sterner voice again prevailed. Still at thought that sometime during the day now close at hand he was to see the last of this woman who had stood there before him in his cabin, with dark eyes looking into his, with eager, oval face upturned to his, with all that glory of lustrous hair a flood about her shoulders, something unknown, unwonted, fingered at the latchets of his heart.

He realized that he felt strange, uneasy, uprooted from his sober aplomb. Unknown irritations possessed him. Under his breath he muttered an Arabic cynicism about woman, from the fourth chapter of the Koran; "Men shall have the preëminence above women, because Allah hath caused the one of them to excel the other!"

Then came the philosophical reflection:

"Man, you were seeking new sensations, new experiences, to stir your pulses. This woman has given you many. She has served her purpose. Now let her go!"

Thus, seeming to have reached a certain finality of decision, he dismissed her again from his mind—for perhaps the twentieth time—and with new care once more began studying the gold-edged, shining clouds where now a dull, broad arc of molten metal had burned its way out of the mists.

The Master slid colored ray-filters over his binoculars, to shield his eyes from the direct dazzle of the rising sun, and swept that incandescent arc. Suddenly he drew a sharp intake of breath.

"Sighted something, eh?" demanded the major, already recovered from the snub administered.

"See for yourself, major, what you make of it! Right in the sun's eye, and off to southward—all along that fantastic, crimson cloud-castle."

Bohannan's gaze narrowed through his own glasses. Bracing his powerful legs against the quivering jar of the aileron, he brushed up the horizon into his eager vision. The glasses steadied. There, of a truth, black midges had appeared, coming up over the world's rim like a startled covey of quail.

(To be continued)

WHAT IS YOUR KNOWLEDGE OF AVIATION?

Test Yourself by This Questionnaire

THE questions given below are taken from the stories in this issue. They will serve, by your ability to answer them, to test yourself in your knowledge of aviation. By thus testing yourself, you will be able to fix in your mind a number of important facts of aviation that are presented by the stories.

The pages, on which the answers are given, follow each question.

1—What is the mechanical means of lifting a plane vertically? (Page 638)

2—What effect would a strong magnetic field have on an ignition system? How could one protect against it? (Page 641)

3—What factors control the speed of a plane? (Page 642)

4—What is a possible-substitute for gasoline in an internal combustion engine? What are its qualities? (Page 643)

5—What metals usually compose the greater part of a meteor? (Page 633)

6—What effect has oil on the waves of the sea? How could a similar effect be produced in the air? (Page 615)

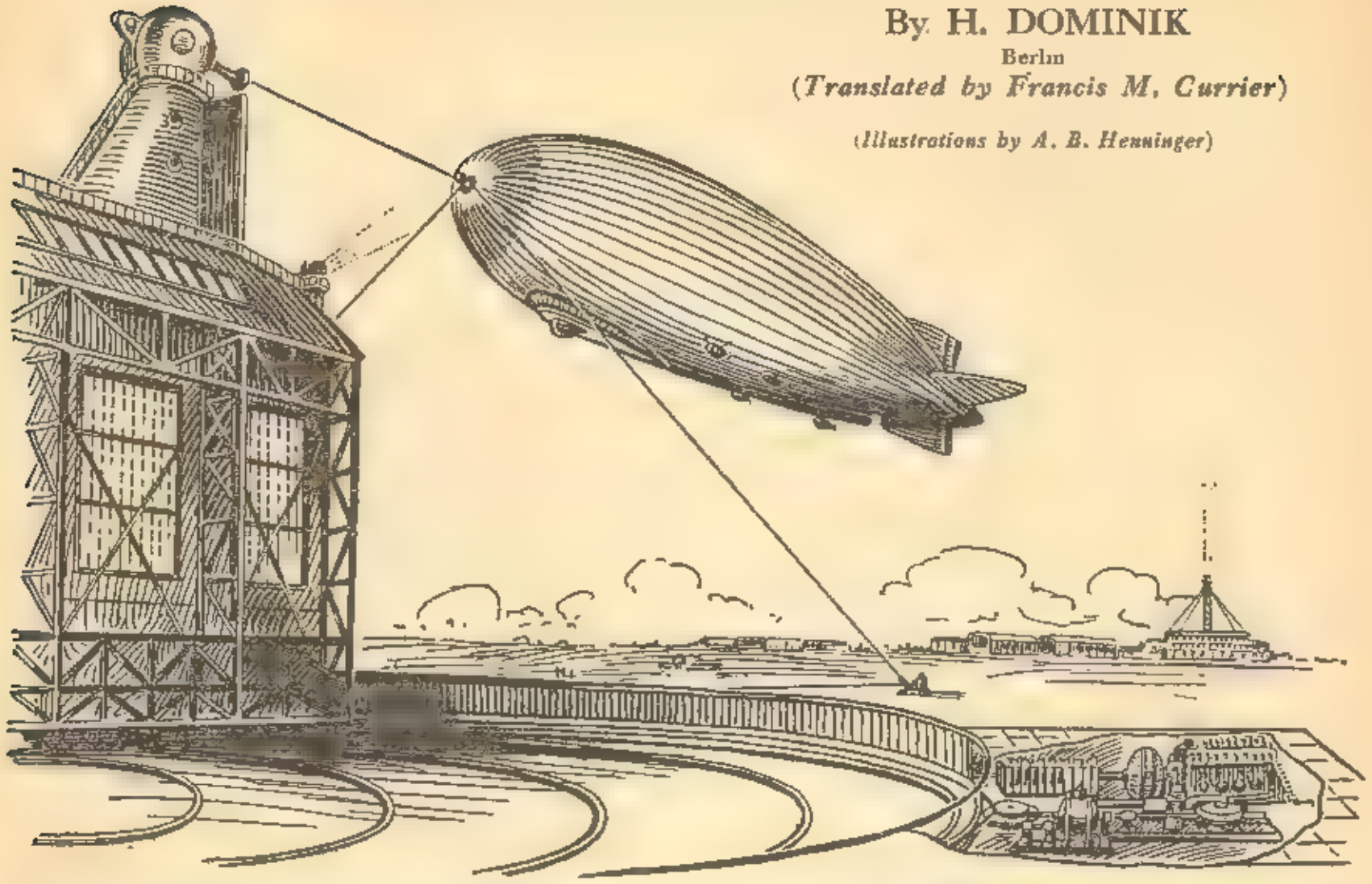
7—What is the value of a double-ignition system for an airplane? (Page 624)

8—What is the function of the airfoil of an airplane? (Page 625)

Airports for World Traffic

By H. DOMINIK
Berlin
(*Translated by Francis M. Currier*)

(*Illustrations by A. B. Henninger*)

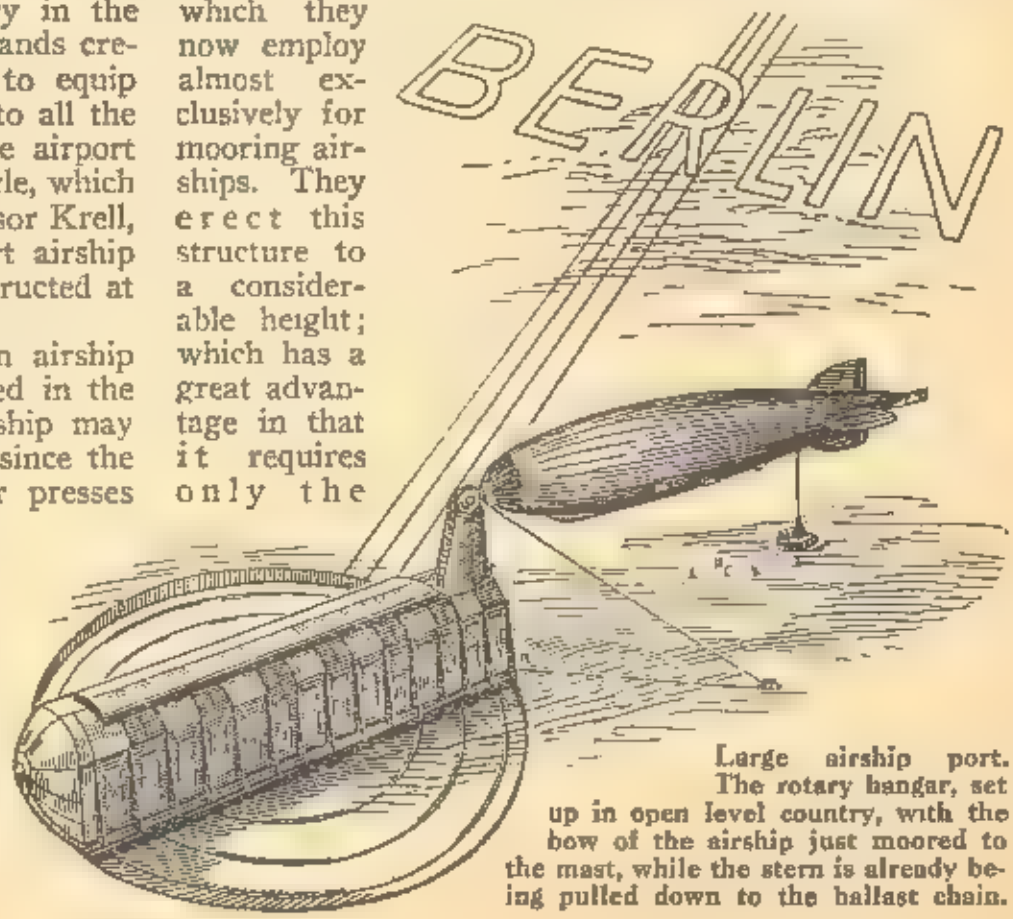


A newly-arrived airship is being drawn to the mooring mast of the rotary hanger. The tractor with the ballast chain is being held in readiness to receive the line let down from the stern of the ship, and connect it with the end of the chain. At the right, below (in section), is the subterranean engine room. The electrically-operated cable drive of the hangar with the hydraulic tension apparatus for the cable. Electric and hydraulic storage plants.

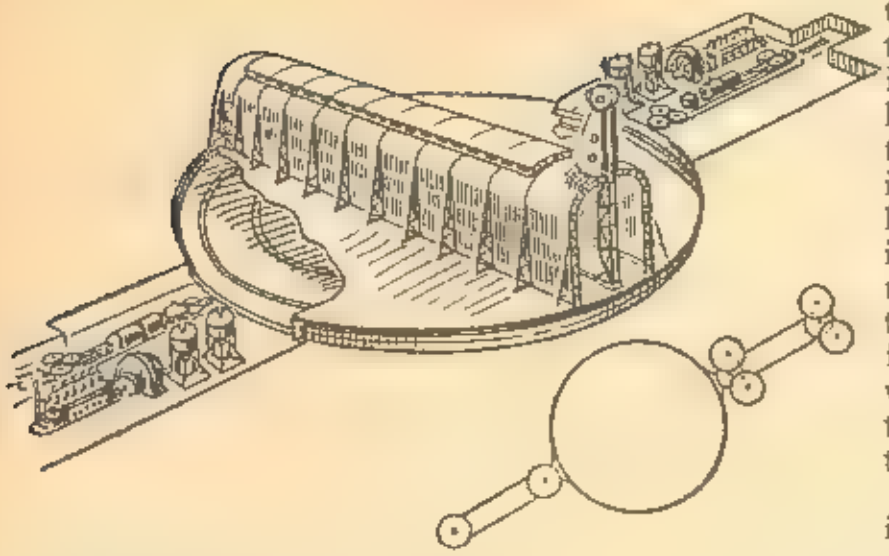
JUST as very costly harbor improvements are now required to accommodate the highly-systematized ocean traffic of the present day, it will be necessary in the future, in order to meet the demands created by international aerial transportation, to equip extensive landing places with devices suited to all the peculiarities of the airship. How the future airport must be laid out is shown in the following article, which is based on the plans and experience of Professor Krell, under whose direction the Siemens-Schuckert airship and the first rotary airship hangar were constructed at Biesdorf, Germany.

Provision should be made for rotating an airship hangar, so that its axis may always be placed in the direction of the wind, in order that the airship may enter it with nose toward the wind. Then, since the wind blowing past each side of the hangar presses laterally against the airship, the latter is held firmly, and, no matter how hard the wind blows, the ship can enter the comparatively narrow hangar door without striking against the sides. This is not a theoretical statement, but based on the experience of four and a half years in the operation of the rotary hangar at Biesdorf.

An airship may also be protected from contact with the ground (which is most disastrous to a rigid-frame ship) by fastening its nose at a height sufficient to permit the hull to turn freely in the wind like a weathervane. This idea, suggested in 1910 by Krell, has been developed by the English in the well-known mooring mast, which they now employ almost exclusively for mooring airships. They erect this structure to a considerable height; which has a great advantage in that it requires only the



Large airship port. The rotary hangar, set up in open level country, with the bow of the airship just moored to the mast, while the stern is already being pulled down to the ballast chain.



Rotary hangar (cable drive) with the rail-pit uncovered. In section, the paired subterranean electric plants for operating the endless steel cable slung around the circumference of the hangar-base and made taut by hydraulic power.

minimum crew (about six men) to hold the ship. But, if it is desired to keep the ship close to the ground, which of course demands a great number of men, then it is preferable to use a lower mast and to anchor the tip of the car to the ground; since this places the ship under the direct observation of the ground crew.

Removing an airship from either a high or a low mast to a fixed hangar can take place only under favorable conditions of wind and weather, and with the aid of a crew of several hundred men. Even then, there is great danger that the procedure will be disturbed by a sudden gust.

Krell's proposal unites the advantages of the high mast with those of the rotary hangar. He places the mast above the entrance to the hangar; and then draws the ship, which is moored by the bow, down vertically to the lower part of the mast, which is movable. The vertical movements of the ship are meanwhile damped by the tassel-shaped ballast chain shown in the illustration. The ship, thus entirely controlled in its movements, is now drawn into the hangar behind the movable section of the mast. Then the passengers can descend, as they do in a railroad station. The rotary hangar is, so to speak, the inbound and outbound track of the terminal.

The tassel-like chain applies the force, replacing a landing crew. Like the crew, the chain ensures merely that the ship shall not be torn away from the ground by a gust of wind, and likewise that it shall not strike the ground. This task is performed by the use of the chain, very efficiently and more promptly than by any crew of men. But, since this chain is very heavy, it would tear up the ground when the ship enters the hangar. Consequently it is borne along after the ship on a great caterpillar tractor, especially constructed to turn readily, and provided with a trough-shaped platform.

As long as only a few airships are engaged in the traffic of a port, the necessary overhauling after each flight can be done in the rotary hangar itself. But, when the traffic increases, so that one must count on the simultaneous presence of several airships in port, the rotary hangar must be kept free for each ship arriving. This condition is realized by connecting the rotary hangar with fixed hangars, which are placed at a distance from the former. Conveyance between the two is by means of a travelling hangar, capable of moving lengthwise. The rotary hangar must stand entirely by itself, in a level place. Its advantages can be fully utilized only when the currents of wind are parallel to the long axis of the hangar; and no cross-currents are formed by neighboring obstacles, such as buildings, woods, hills, etc. This symmetrical and regular formation of wind currents is necessary for safe entry into the hangar; the force of the wind then does not matter.

The diagram of the entire airport reproduced here illustrates all the steps necessary for the housing of a ship. The airship (L) arrives, goes over to the mooring mast above the entrance to the rotary hangar (S) and enters the hangar, as already described. The hangar is then rotated until its opening is opposite that of the longitudinally movable hangar (S1). The ship is moved into (S1), within which it is conveyed to the fixed hangars, and is transferred into one of them, such as (B). Previously the movable hangar (S1) is enabled to move sideways by revolving its separate trucks, which

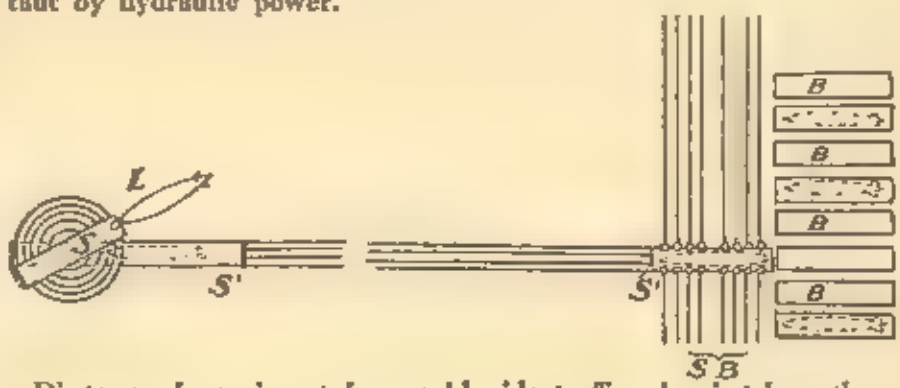
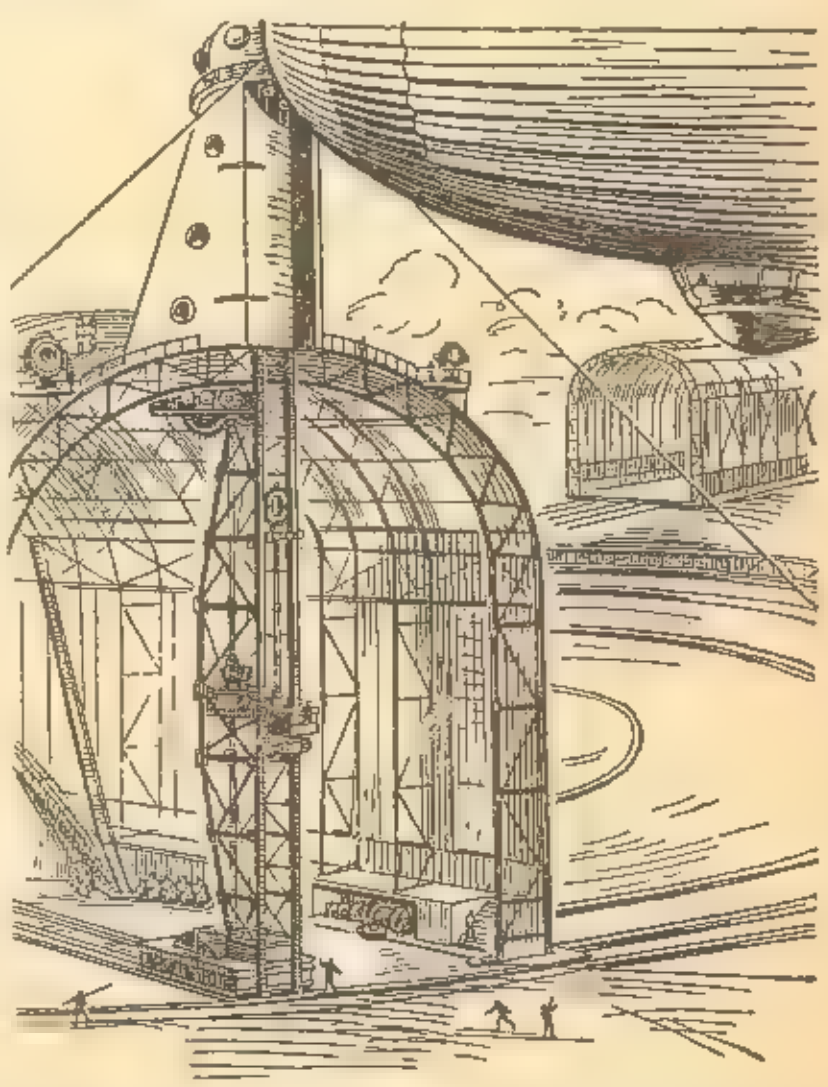
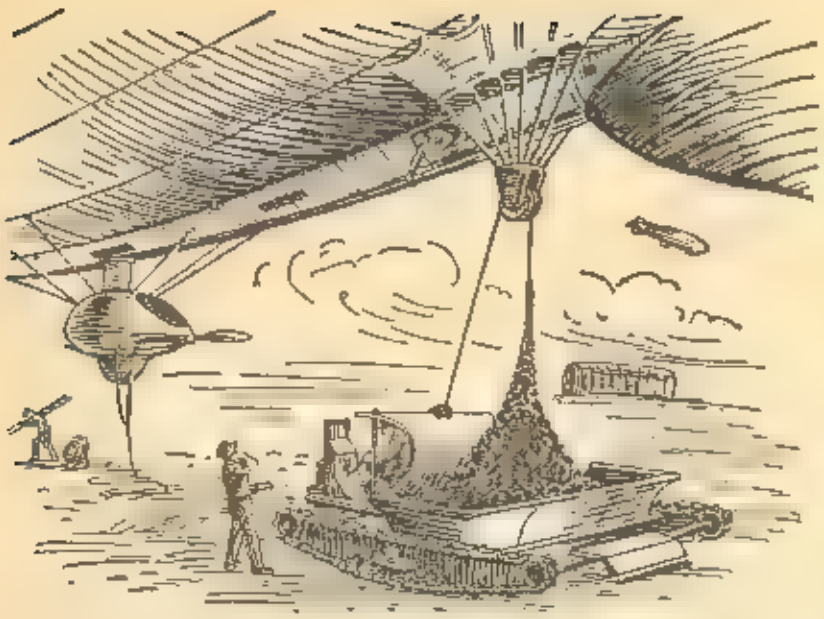


Diagram of an airport for world-wide traffic, showing how the airship (L) after being placed in the movable hangar (S) is transferred by hangar (S) to a permanent fixed hangar (B). (SB) denotes the tracks whereby it can move laterally.



The entrance to the rotary hangar. The airship is held at the tip to the mooring mast. The vertical "elevator," equipped with a place for the operator, is ready to ascend in order to grasp the tip of the airship and draw it down to the vertical girder. Attached to this, the airship is conveyed into the hangar



The stern of the ship, freed from all ballast, is hauled down to a horizontal level by the ballast chain. Bow and stern are made equidistant from the ground. Then begins the operation of conveying the ship into the rotary hangar.

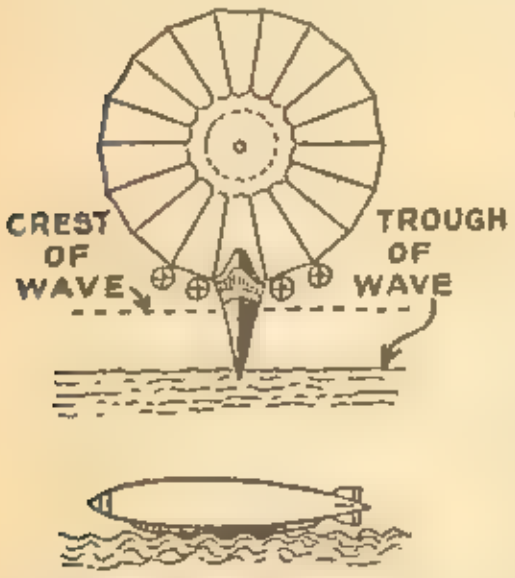
are mounted on rotary members, through an angle of 90 degrees. Thus it can be brought before the fixed hangars, somewhat in the manner of a movable stage in a theatre.

Putting the ships into one great hall, as done with locomotives, is an obvious means of saving space. But, so long as we have to depend on hydrogen to fill the ship and gasoline for the fuel, in view of the great fire hazard, preference will be given to the previously-mentioned arrangement of the hangars. For, having them all in one hall, in case of a great fire, would mean that all the ships would surely be lost.

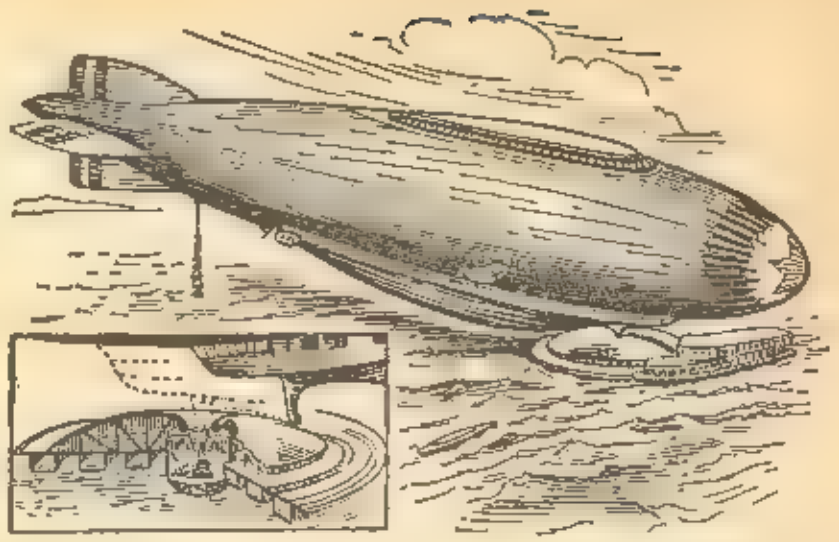
In leaving the port the procedure employed is the reverse of that described for entry.

The larger rigid airships become, the greater the attention must be given to Count Zeppelin's ingenious idea of effecting the descent of an arriving ship upon water In this case a buoying device must replace the mooring mast; the tassel-like ballast chain is likewise replaced by a chain of spherical buckets, which grow larger toward the bottom of the chain. These fill, on being let down into the water, and thus can draw down the stern of the ship, which is freed of all ballast. The damping effect of this device corresponds exactly to that of the tassel-like chain.

The chain of buckets may be made of such light material that it can be taken along on board, which is not possible with the heavy tassel-like chain. Before starting, the buckets are pulled up by a cable attached to the lower end of the chain. Thereby, so many buckets are emptied that the stern is again counterbalanced. Then the entire chain with the water contained is taken on board, and then the water ballast which had been discharged



Cross-section and profile of a trans-oceanic airship with a long keel, showing how the ship is always kept above the crest of the waves.

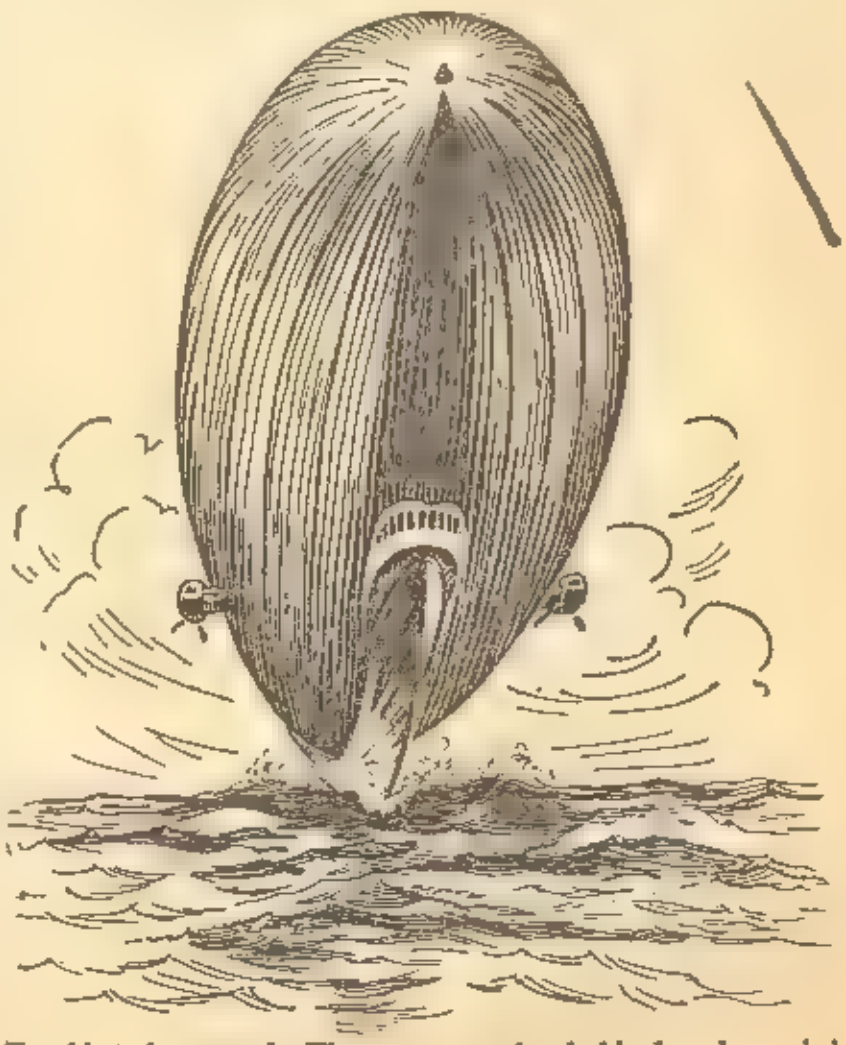


The trans-oceanic airship has just set its landing gear on the great station-buoy. From the stern the ballast chain of cylindrical buckets is being let down into the water. The stern is pulled down and stabilized by this, as with the tassel-like chain. At the left, below, a cross-section of the buoy. The landing gear is drawn by hawser, over the top and through the opening in the buoy, into the conical berth. There it is held fast by the hawser. The whole sketch represents a great airship station on an inland lake, adapted to countries where fixed and rotary hangars cannot be erected on account of the prevalence of earthquakes.

is recovered again. The buoy arrangement can only be used on an inland lake, where there are no great waves.

But, if we have in mind a great airship intended for crossing the ocean, and it must descend occasionally upon the ocean, it is necessary to consider the points brought out below.

The idea that some have advanced, of permitting an airship to descend upon the waves like a gull, cautiously perching on the wave and rocking on it, may be dismissed. The gull has no buoyancy at all to lift it into the air; it is supported simply by the water it displaces. It sinks with the wave into the trough, and is raised by



Touching the water! The trans-oceanic airship has descended and touched its keel to the water.

it again to the crest. Not so with the airship, which floats in the air, except for a small portion of its structure. It does not sink from the crest into the trough of a wave; but it separated from the water, to be struck by a second wave with all the greater violence. Such terrific pounding of waves would speedily wreck any rigid airship.

To escape such a fate, the ship is best provided with a long, high, diving keel; the flat bottom of the car must be prolonged into a sharp wedge-shaped keel, which will dip like the edge of a sharp axe into the water far below. Even a high wave would then exercise no disturbing effect; and the gradually-increasing buoyancy would brake the descent of the ship without putting any dangerous strain on its framework, and permit it to float again. Naturally, the ship must descend in such a way that its keel cuts the line of the waves at right angles. Then the waves run along the keel without straining the framework of the ship. This is not the place to discuss constructional details of this problem; they are very ramified, as one may imagine.

In navigation by airship, the principle of the protective port must be used to solve the problem of safety and security. The above proposals show a way to master the difficulties still presented by the problem, in a satisfactory manner.

THE END.

The Next

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By R. H. ROMANS

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IN THE WINTER SCIENCE WONDER QUARTERLY

On All Newsstands December 15

A MESSAGE TO ALL LOVERS OF SCIENCE FICTION

THERE is a big treat in store for you. Be sure to turn to page 657 as well as page 666 of this issue.

HUGO GERNSBACK,
Editor.

The STORM BUSTER

By Ed Earl Repp

(*Illustration by Paul*)

As the current was gradually stepped up, the bomber seemed to be in the center of a hollow shell of pale blue fire.

By the Author of "Beyond Gravity," "Flight of the Eastern Star," "Radium Pool," etc.

WITH all her twenty-four great dual motors throbbing softly and her forty-eight multiple airscrews moaning an impatient song to be off, the huge Fornier-Dahl tugged powerfully at her tail anchors and dipped her knife-edged prow into the gentle swells that eventuually curled up on the beach at Honolulu. To the fascinating tune of a dozen wailing guitars and ukuleles playing the traditional "Aloha Oe," a long line of passengers rapidly vanished over a ramp from a floating landing, into the spacious confines of the trans-Pacific airliner. Now they were headed home once again, to live in the memories of the southern seas—coral beaches, warm, amorous hulas and strumming guitars.

Like some monstrous amphibian of a dawn-age, the Fornier-Dahl, known as the *City of Honolulu,* one of several hundred similar ships owned and operated by the Trans-Pacific Company of California, rolled gently with each warm swell of the water. Aerofoils glistening in the brilliant sun of mid-morning, body gorgeous in the typical colors of the concern that owned it, the *City of Honolulu,* with a capacity passenger list and cargo, was ready to take the air and roar her way across the 2300 miles of storm-infested space between Diamond Head and San Pedro, California. Her powerful Diesels were muffled, as though signing a take-off salute to those who watched from the landing. The passengers, seated in the main cabin beside open windows, listened to the moaning guitars as they played the farewell song of the Islands. Then a musical bell sounded within the ship and the ports were closed. Passengers settled back, happy and joyous as the Diesel motors opened their throats and bellowed a defiance to the elements.

The *City of Honolulu* roared toward the open sea, her screws churning the air until her laterals rose from the choppy surface. For half a mile she raced ahead into the wind, sending sizzling spray high up along her streamed lined sides. Then she swung into the air with the grace of a sandpiper. She spiraled gracefully back over Honolulu, turned again and headed east, north - east toward America.

There was little difference between the passengers of the Fornier-Dahl and the passengers of an ocean liner. Not at all tensed or thrilled by the prospects of an exciting voyage, they laughed, joked or read while the huge ship hurtled through the bumpy air. They knew that the *City of Honolulu,* like the ocean liner, was impregnable to the onslaughts of the mighty elements. True, there had been many aerial disasters of late; but nothing, of course, could stand in the way of successful flights by these monster vessels of the air especially as operated by the Trans-Pacific Company. And so, when the *City of Honolulu* suddenly entered an air pocket and wobbled into a two-hundred-foot plunge, the passengers laughed it off.

"I'm going to see about having those air pockets sewed up! laughed a big button and thread man from Cleveland.

The passengers in the main cabin guffawed loudly in the spirit of the occasion, serene and contented while the mighty bird of the upper reaches raced at a terrific speed toward a bank of seething, black clouds that was forming ominously in its path. But they paid little heed to that; it was something for pilots to worry about

ED EARL REPP

For several hundred miles, or more, a humorous line of chatter was kept up; with the jokes running from the dear old Scotch to the alluring maidens of Hawaii. Then suddenly the *City of Honolulu* scudded skyward in a none-too-gentle Pacific up-draft. Overhead the skies were a seething mass of black clouds through which the lightning played in an almost ceaseless flashing. As though drawn irresistibly into the heaving elements of the air, the *City of Honolulu* pitched upward sharply at such an angle that those in the cabin suddenly found themselves clinging to their fixed wicker chairs. Before they could scarcely know what was happening the ship was in the midst of a maelstrom of thunder, lightning and terror!

The *City of Honolulu* had been picked up literally by a terrific draft of ascending air and whisked along into the core of the storm. Like a cork on an angry sea the huge craft plunged, spun and whirled with sickening, nauseating lurches that at once created pandemonium within the confines of the Fornier-Dahl. A colored chef, face streaked with perspiration, eyes wide, whites bulging with growing fright, dashed from the ship's galley abaft the double line of small cabins lining a narrow companionway, and knelt down, praying fervently. A great bolt of lightning flashed across the black massed clouds, its comet-like head hissing with a potent threat. A clap of thunder reverberated through the struggling craft from screw-stems to lateral cotters. To those inside it was like being penned up in a huge bass drum with some giant drummer pounding upon the head.

The pompous gentle-

IT is a scientific fact that the tremendous waves in the ocean can be calmed by means of oil. No good explanation has ever been forthcoming why this should be so, except that the surface tension of the oil pressed on the water. But the fact remains that oil is often used to smooth an otherwise angry sea.

The atmosphere is also an ocean; but, so far, nothing has been discovered to smooth atmosperic waves or to calm thunderstorms. Sooner or later, some scheme will be found whereby an airplane or airship can ride an angry storm without being in the least affected by it—simply by surrounding itself by an envelope of calm air.

Such are the thoughts of our versatile author; and there is no reason why such a scheme as he proposed will not be invented sooner or later. And as is usual with Mr. Repp, we are not only regaled with science, but with a goodly amount of hair-raising excitement and action.

The present offering is one of Mr. Repp's best. We are sure you will like it.

man from Cleveland forgot his jokes when he glanced through a dripping port. The huge metal aerofoils of the Fornier-Dahl seemed aflame with a vivid blue fire. Singeing bolts of twisting electricity leaped from the sustaining aerofoils and travelled down to the short pontoon stabilizers. The Clevelander yelled to a thoroughly frightened globe-trotter to look.

"St. Elmo's fire!" he shouted. "We are doomed!"

He was shot into a corner by a sudden twist of the now stricken ship. Streamers of blue-white flame flashed in the cabin and there came a loud report like the roar of a long-range cannon as one of the Diesels on top of the aerofoils was struck by a bolt and exploded. A ceasless display of lightning flickered around the huge man-made bird; then, one by one, the powerful Diesels shot to fragments, ripping gaping holes in the metal aerofoil surfaces. Blinding flashes stunned the senses of those who watched, terror-stricken, from the cabins. The craft appeared to have become a thing of flame, a mass of fire struggling to release itself from the wonderful grip or an elemental giant. Strangely the ethylene tanks had not yet exploded; but that was inevitable. It came so abruptly that the great ship seemed to stop like a stricken bird. Then there came in a mass of vari-colored flame and streaking its flaming way down to the Pacific, the ship wrote in blood and fire another chapter in the log of man's struggles with the elements!

The Reckoning

EVER since man first began to rely upon mechanical means of transportation, abandoning the legs which had carried him like a slinking beast through the jungles of the Beginning, great catastrophes have occurred. Innumerable are the old time windjammers, foaming downwind before a blasting sou'wester, that have vanished; many a steel hulk had gone down before the onslaughts of the unconquered elements, to say nothing of the terrible wrecks along the miles of steel over which thundered the snorting beasts of iron. So, when the *City of Honolulu* fell to the seething waves below, the world was awakened to the fact that a new disaster had occurred, and the lives of exactly two hundred and fifty people had been snuffed out! And the world demanded an explanation, notwithstanding the fact that catastrophes similar to this had reaped rich harvests in life since man first began to ride rather than walk.

But despite all the explanations and investigations of the officials of the Trans-Pacific Company and the government, they could not bring back those who had given up their lives. But their lives were not lost in vain! Science might awaken to the fact that there was still something else that had to be conquered before man could safely ascend into and travel through the air. The elements! The elements must be harnessed or conquered, so that human life in the air would no longer be imperiled. And the world, through glaring newspaper headlines, did not hesitate to state the fact. It stated also in plain, readable black and white, that the public would no longer pay exorbitant rates to air transport concerns just for the privilege of flying as bottom ballast! Nor could the public be blamed. Too many aerial accidents had taken place in recent years. And a world that had suddenly gone speed-mad became suddenly cautious people. They simply refused to fly!

Consequently many huge transport companies faced bankruptcy as the result of the *City of Honolulu* disaster. But instead of clamping down and hangaring their great ships that plied to every nook and cranny of the earth, until the memory of the thing blew over, they permitted the ships to continue flying their regular courses believing that the world would eventually forget the recent disasters. They faced almost certain financial ruin, with no passengers willing to fly and no business concerns willing to risk products in aerial transportation.

Aircraft of the newer types had abandoned the lower levels for travel. Instead of flying at the four- or five-thousand-ft. altitudes, the huge liners of the Trans-Pacific Company flew their courses at 25,000-ft. elevations. Atmospherical upheavals were more severe and frequent there than below; but the huge ships had either to fly so high, or become ground locked. In the lower altitudes there was too much friction on ships of the Fornier-Dahl type to permit sufficiently high speeds. Still, craft had continued to crack up under the powerful influence of the elements. Lives often rested on the ability of a pilot to slew his ship out of the bumpy air-troughs and wiggle its ailerons until they were clear of the tormenting areas.

And so aviation came to a standstill. Of course there were brave souls who will face almost inevitable annihilation to gain a few extra dollars by saving an hour's time. But they were so few and far between that the liners went about their business of eating up in operating expenses the resources of the owners.

It was a dire situation indeed. So dreadful and mournful that every student of physics, meteorology or in fact, everyone who boasted a smattering of scientific knowledge, was delving into his brains for some kind of a solution to the problem of making the air safe for man. Big rewards could be harvested from such a successful solution. The governments of the world openly advertised the fact, and the individual appropriations that were to go to the discoverer were pooled together *en masse* to give a more tempting incentive. But, whether it was the desire of snaring the reward or a disinterested hope of re-establishing aviation on a more sound basis that led Marshall Dunning to enter the field, was not known.

CHAPTER II

Marshall Dunning

YOUNG Marshall Dunning, student of physics at the Institute of Technology, did not appear to be the kind of man to let financial rewards guide him when he set to work on a problem. Of course whatever rewards for any of his achievements that might be handed to him were without doubt welcome. Marshall Dunning, for five years, had been working his way through the Institute by doing all the heavy work in the great laboratory. That in itself *was a job;* but apparently it did not interfere to any great extent with that ambitious young man's studies. So far as money was concerned, well—every young man working through college needs money, and especially Marshall Dunning. Almost broke, with two more years to go before obtaining his degree.

Marshall Dunning was not aware of it; but the faculty had taken a keen liking to him since the first day he applied for his scholarship. He was an ideal student. Had he known of the high esteem in which he was held he might have blown up long before his first year at the institution was up. But wise men, those silver-haired scientists! They knew that open admiration of a youngster would be more harmful that frequent raking over the coals. Thus Marshall Dunning had been led to believe that as a promising young sci-

entist he was nothing more than an expert with a mop, soap and holystone.

To be frank, it took him one week to define the internal phenomena of the atom; while a month was required for him to learn to manipulate said holystone on the greasy floor of the laboratory. He gradually became proficient at both—the atom and the well-worn brick! And, after a time, those same silver-haired gentlemen, scientific masters everyone, recognized in this young man with his shock of dun-colored hair, a man possessed with a rare genius for observing things and getting to the bottom of their meaning.

They began to consult him frequently on certain questions on which they had disagreed. The result was that his theories, advanced seemingly on the spur of the moment, could usually be worked out to the most satisfactory consequences. His was a fertile mind not only imaginative, and inventive but practical; a rare, almost divine power that ordinarily does not exist in a man so young as he. And it did not, as has been said, take long for his superiors to realize the fact.

When he applied to the gray-haired Chancellor of the institution and presented his college documents, Professor Hobson beheld in him a shy young man whose appearance, though neat, was little short of pitiful. His elbows were worn almost to the point of becoming ragged and his trousers needed something more potent than an ordinary sad-iron to keep the shiny knees from bulging. Professor Hobson saw at once the youth's ambition. That he would make good, the scientist did not doubt. There was a something in the young man's flashing gray eyes that seemed to scream his ambition to solve the world's vexing scientific problems. And the scientist saw in the boy's two calloused gnarled hands, hard work, the laboring for a meagre existence. He entered the school, worked as a waiter and scrub-woman. From then on he worked and learned and stored vast chunks of solid knowledge in the cubbyholes of his growing brain.

So when the news of the *City of Honolulu* disaster reached him the thought of its significance became uppermost in his mind, Marshall Dunning began to work as he never had before. As has been said, he understood the meaning of the internal phenomena of the atom and a lot of other things of more or less importance to this story. He knew that in the atom existed the solution of the mystery of the nature of matter.

He had secretly performed what no other man in the world had ever done. He had split the oxygen atom. As we know, the nucleus of the atom, a very tiny sun as it were, centers on many smaller particles called electrons which revolved around this tiny central particle as satellites. He knew also, of course, that the electrons are electrically negative while the protons are charged with positive electricity and that the positive charge of the nucleus prevents the negative electrons from repelling each other so strongly as to leave the system. Then he discovered a means to cause the electrons to leave the atom by using a positive charge greater than that, which the nucleus holds.

All this research had been done secretly but under the sanction of the institution. Dunning worked hard and long, on many occasions throughout the night; so that he could have the use of the high-voltage apparatus all to himself. So when he split the atom, and figuratively laid it out and studied its structure, he thought he knew at once just how he was going to create a means for controlling the devastating elements above the earth's surface.

Working behind a two-foot thick enclosure of lead, Marshall Dunning operated the high-voltage equipment in comparative safety until one day he managed to create an artificial thunderstorm in the laboratory. That experiment, especially with the lightning display, was to establish firmly the danger of the subject.

An Accident

HE had equipment which gave him 220 volts of 60-cycle alternating current, with a transformer to step up the voltage to 70,000 for condensation and discharge during infinitesimal pauses. The 70,000 volts were stepped up again and when they leaped a spark gap the voltage reached the astounding potential of 5,500,000. In doing this he created an artificial storm that nearly wrecked the great laboratory and caused him to be lifted bodily from behind his walls of lead and hurled clear through a ground-glass window. When Marshall Dunning picked himself up from the trimmed lawn surrounding the laboratory, half dazed, his face and hands tingling with pain, his clothing in smoking shreads, he knew at once that he had been struck by his own artificial lightning

As suddenly as the artificial storm had arisen, it had vanished. Unmindful of the severe burns he had received he dashed back into the laboratory. Wreckage was everywhere. Even the lead enclosure lay bent and twisted as though some giant hammer had flattened it into a shapeless mass. A gaping hole where the bolt had struck it, lay open. Here also was the spot from which he had been hurled. But, in looking over the apparatus, he discovered that the equipment for producing the storm remained in perfect condition and was functioning strangely. Now, as he looked at his meter readings, something struck him like a second bolt. He grabbed up a pencil stub and began jotting down instrumental readings from the functioning devices on a pad of paper. It was then that the singed skin peeled from his numbed, burnt hands and stuck to the pad and pencil. Yet he gritted his teeth and made notes until he could no longer stand the terrific pain that surged through him. Then with a groan he sank to the floor.

Thus he was found huddled perilously close to the flashing apparatus by Professor Hamlin, chief of the physical staff. Sparks were flying in widening circles between his head and the triple gaps. His head lay against a steel stanchion and his body would have been an ideal conductor for further wreckage. But Professor Hamlin did not hesitate to dash to his side and pull him away to safety. The step-up units were beginning to skip and the voltage was rising, searing flashes hummed songs of ominous destruction. The elder scientist raced to the input system and jerked the switch. The apparatus sputtered and went dead instantly.

While Marshall Dunning lay swathed in smelly bandages on a hospital cot, the Chancellor of the institution was holding a conference with department heads. Faces stern and serious, brows knitted and lips drawn tight, the scientists argued among themselves whether or not a certain young student was eligible to continue his studies at the Institute of Technology. The conference seemed divided on the subject and occasional hot words were shot back and forth. In view of the great damage he had caused in the laboratory, there were those who demanded his dismissal at once. On the other side, Professor Hamlin held on stubbornly in Marshall Dunning's defense.

"I don't give a damn how much damage that boy has done!" he shouted at Dr. Worton, who had just

issued a scathing denunciation against the youth for his persistent "fooling" in the laboratory: "He will make a name for this institution before many more moons! Whatever damage he has done will be amply covered by the Robertson Appropriation! The boy is a credit to this outfit and, if he is dismissed for working out his theories, then you can consider my resignation effective at the same time!"

"Now, now, gentlemen!" the chancellor said: "It is not just a matter of dismissals. It is a matter of expense. Young Dunning is without a doubt the finest student we have enrolled, but he is too expensive. According to check-up, his research work has cost the institution forty thousand dollars! What will our Endowment Committee say when they learn of the needless waste of materials? Perhaps you are a little hasty in your ultimatum, Professor Hamlin!"

Hamlin Wins

THE scientist regarded him coolly for an instant, aware that his seething anger was mounting ever higher.

"I was not hasty, my dear Chancellor!" he said: "I spoke what is in my heart! If a man cannot experiment in this institution without being made the goat in event of adverse consequences; then I definitely declare myself off the faculty!"

"Why should you take so much interest in young Dunning, professor?" Chancellor Hobson asked. "Would you be willing to reimburse the institution for half the amount of the damage?"

Professor Hamlin's face twisted in exasperation at the Chancellor's last query.

"I'm interested in that boy because he is a genius at physics! What lies under that dun-colored hair is more than equal to the brains of the entire physical faculty! That's why! I am professor of physics for the sake of science, not for the dollars that might come my way. You mark my words, that if you dismiss young Dunning you will have removed a valuable keystone from the foundation of the institution! If I possessed the sum of $40,000, I would hand it to you at once. Moreover I have a standing offer from the Occidental University to preside over their department of Atomic Science. If Dunning is discharged we shall go there at once!"

"Then take him and go!" the secretary roared.

"You're just a money hog, Blakeley!" Professor Hamlin shouted, rising from his chair and lurching forward: "If you ever spent a cent for scientific advancement you'd die of grief!"

Secretary Blakeley picked up a book from the table and hurled it maliciously at the approaching physicist. The latter dodged neatly and it plunged into a corner with a spiteful smack. There never had existed much friendliness between Professor Hamlin and Secretary Blakeley; the former had always purposely avoided the latter simply to keep peace within the ranks of the faculty. Now a long smouldering hatred for each other was apparently manifesting itself.

Chancellor Hobson rose immediately and planted himself between the two enraged men.

"That is enough, gentlemen!" he said, sternly, placing both hands on Professor Hamlin's chest to stay his rush. Dr. Blakeley's face had reddened, but he remained seated without removing his horn-rimmed glasses. Perhaps he thought to protect himself from the gnarled fists of the physicist. At any rate the conference was suddenly halted by the deadly stillness that had fallen over it. The faculty sat around the conference table, casting sly glances at one another. Secretary Blakeley presently arose and stamped out of the room, as though washing his hands of the affair.

"We naturally dislike to lose you, Hamlin," the Chancellor said eventually: "And it is agreed that we all admire young Dunning as we admire you personally. You have done some marvelous work here, you have practically established our physical department on a firm foundation of important achievements. You must realize that, as Chancellor here, I am not the dictator of this institution. If I were, this conference would not have taken place. On the other hand I have learned that the Endowment Committee will not tolerate any considerable loss. Therefore, apparently, the only thing that is left for me is to protect myself and the rest of us, is to demand the dismissal of the offenders.

"But, since you have taken the stand that you have, I'm going to attempt to set a precedent here by telling those above us to go to hell! Since I have certain units of the institution in my own control now, there can be no really serious results. So, if you still are willing to remain with us, we shall be glad to have you."

"I would like to remain, beyond doubt, Chancellor," the physicist replied, "but I refuse to do so unless Marshall Dunning is given a clean bill. That boy is going to assert his genius in very short order, and you will not regret keeping him on the roster."

The silver-haired Chancellor smiled, as though relieved by a sudden decision.

"Forget it, Hamlin!" he said: "Go to the boy and tell him that he is welcome to remain with us; but for goodness sake, explain to him that our expenses are high enough without adding to them by wrecking the laboratory!"

Professor Hamlin reached out and wrung the palm of the Chancellor.

"Thank you, sir!" he said. He rose and stalked out of the room victoriously.

But Professor Hamlin did not mention the matter when he went direct to Marshall Dunning's room. That young man smiled wanly as the scientist entered, and held up his arms, swathed in gauze. His face was a smear of pasty salve and around his head was a tighty-wrapped bandage which held together several deep gashes. Hamlin looked down on him with admiration. And the faculty had threatened to expel him! Dunning was not aware of it; but, in the plain unadulterated words of the physicist, it was a hell of an idea!

An Amazing Statement

"WELL, you've snapped out of it, eh, Marshall?" Professor Hamlin asked first. The young scientist had been completely unconscious when Hamlin had last beheld him. Physicians were sewing Dunning's gashes and anointing the burns and abrasions when Hamlin left his side several hours ago at the call of the Chancellor. Now the boy appeared to be coming along as well as could be expected but it would be weeks before Dunning was able to move about comfortably.

"Oh, I'm all right, sir," Marshall replied weakly, trying to smile. The bandages were tight on his face and the smile refused to form, although his eyes glittered in gratitude. "I suppose I'm due for a kick in the pants for smashing up the lab," he continued: "But what I have learned will amply pay for the damage!"

"Learned?" Professor Hamlin asked, regarding him quizzically as he drew a chair to the bedside. "What do you mean, Marshall?"

"Accidentally, sir," the young man said, "I discovered a means for controlling the elements! In produc-

ing my artificial lightning I also found a means to create a temporary field of unelectrolyzed air, my readings showed it. I believe, sir, that we can re-establish aviation on a greater foundation than ever before. What happened was that in a small area of the laboratory I neutralized an artificial storm of great intensity. Of course what happened to me was that I deflected the whole force of it in my direction. But I don't think there will be more *City of Honolulu* disasters—especially through the elements!"

"Just a minute, Marshall—you talk too fast!" Professor Hamlin said incredulously; "Repeat it, will you?"

Dunning slowly repeated his amazing statement. Hamlin sat back in his chair and with glaring, unbelieving eyes surveyed the young man.

"My God, Marshall!" he said: "You have taken the electric charge away from the atom? You've succeeded in controlling and directing an artificial storm whose lightning intensity was more than five million volts? It can't be true, Marshall, my boy! You must be laboring under a—"

Marshall Dunning chuckled at the incredulity of his beloved instructor.

"Laboring under a curse of inactivity, sir!" he put in: "Have you ever known me to lie, professor? I've been here five years and I've never lied about anything. Now I'm laid up and can't finish the work I started out to do—make aviation safe for man by neutralizing the elements! By the way, if you will let me have my note book, I'll prove my statements."

The scientist looked at him thoughtfully for a moment and then leaned forward.

"Notebook?" he asked: "What notebook?"

"The one I had in my hands when I keeled over in the lab, sir!" Marshall replied. "Didn't you get it?"

"I didn't see it, Marshall." Professor Hamlin confessed: "I didn't look around the lab when I found you there. I'll go down and get it!"

"Will you do that, sir?" the youth asked eagerly. "Find it and we shall work it out together!"

But when Professor Hamlin reached the laboratory, two janitors under the direction of Dr. Blakeley were at work vigorously cleaning up the wreckage that had been left by Marshall Dunning. The secretary was engaged in tallying the damage, and writing his notes on a scarred batch of papers. He ignored the physicist entirely as the latter approached him.

"See anything of a notebook laying around, Blakeley?" Hamlin inquired, kicking at a pile of debris that a janitor was sweeping up. Blakeley continued his jotting as though he had not heard. The colored janitor regarded him questioningly, and then continued sweeping.

"Dr. Blakeley!" Professor Hamlin said evenly: "I asked if you found a notebook lying around?"

The secretary turned and gave him a withering glance, and turned his papers over in his hands.

"What difference does it make, Professor Hamlin?" he replied with stinging sarcasm in his tone: "It could be of little importance to anyone if I did!"

Threateningly the physicist advanced upon Dr. Blakeley, who retreated backward, shoving the sheaf of fire-scorched papers into his pocket.

"Listen, Blakeley!" Professor Hamlin said, halting before him and shaking his finger at the secretary: "If there was a notebook to be found here, you found it! Hand it over!"

Trembling at the hostile attitude of the physicist, the secretary insisted that he had found nothing. Professor Hamlin, temporarily stumped, walked away and began puttering around the heaps of rubbish and debris. The janitors came to his assistance; but they found nothing in the shape of that which he sought. Dr. Blakeley had edged his way out of the laboratory. Then the colored man spoke.

"Doctah Blakeley done took the only papahs found heah, suh!" he said, frightened at his own admission: "But doan' tell 'im I told you, suh!"

"Thanks, Johnson! That's all I want to know! Don't you worry!" Professor Hamlin said, jubilantly. "I felt that the sneak had it well enough!"

CHAPTER IV

Blakeley Confronted

WITH anger rising in his heart Professor Hamlin mounted the stairs leading from the outside into the main building of the institution, and went rapidly to the office of the secretary. Dr. Blakeley had not yet arrived and the physicist, lips drawn tight and fingers clenched into the palms of his hands, sat down to wait. He sat tensely for a few minutes, got up and began a ceaseless pacing back and forth across the carpeted floor. Presently he glanced at his watch and compared its readings with the big clock on the wall. He had been waiting twenty minutes and he began to wonder if Dr. Blakeley had recognized something of great importance in Marshall Dunning's notes. What if Blakeley had understood the great value of the young man's achievements in the field of physics? Blakeley was a smart man right enough, but was he brilliant enough to get the implications of Dunning's discovery? But you never could be sure of such a man. And so Professor Hamlin waited and waited in vain until he could no longer stand the strain. Then he hurried out of the room, cursing under his breath as he went.

Some strange influence drew him again to the physical laboratory. With unerring steps he returned to it. The janitors had removed the piles of debris and departed. The laboratory was quiet, deserted. He walked over and inspected the mass of twisted lead, crawled into it and studied the effects of the bolt that had struck it. He was amazed that Marshall Dunning had not met his death when the bolt struck. As he speculated upon the narrowness of his escape he heard shuffling footsteps on the sairs leading down into the room. He paused, out of sight, and peered through the gaping hole made by the bolt.

Dr. Blakeley stood on the concrete floor just below the steps and scanned every nook and corner of the laboratory before he walked lightly to the equipment. He drew a scorched pad from his pocket and began what Professor Hamlin thought was diagramming the apparatus. Swiftly the secretary's pencil shot back and forth across a blank sheet as he recorded the structure of the equipment. Swearing under his breath the physicist watched from his obscure hiding place. Frequently Blakeley paused to listen. Hearing nothing he continued sketching until presently he folded the documents neatly and placed them in a pocket. It has then that Professor Hamlin emerged through the hole in the lead shield and stood in plain view. Blakeley beheld him at once and his face reddened. Then he turned abruptly and ignoring the enraged physicist walked swiftly to the door. But Professor Hamlin had no intentions of permitting the secretary to get away. There had been plenty in the attitude of the man that aroused the physicist's suspicions. What was he trying to do, anyhow? Steal for his own gain Dunning's records

of his invaluable discoveries? Did he think that he could reap the rich harvests that lay waiting for someone who had a formula that would place aerial travel and shipping once again in the realm of safe transportation?

With a bound Professor Hamlin was soon upon the secretary. Dr. Blakeley turned around and swung out with his fist. It caught the physicist square on the chin and sent him spinning dizzily to the floor. Without waiting to see the results of his thrust, Blakeley swung up the steps rapidly. Rubbing his jaw and tottering like a drunken man, Professor Hamlin arose to his feet and tumbled after his assailant. Swiftly his head cleared.

Moving rapidly across the lawn toward a sedan that was parked along the curbing, Dr. Blakeley was evidently taking no chances of further encounter with the big-fisted scientist. Instantly Professor Hamlin swung into a run and overtook the secretary as he stepped on the running board of his car.

"I ought to smash you, Blakeley!" he growled, shoving his clenched fist under his nose. A dribble of blood dripped from his lips as he opened them. Dr. Blakeley saw it and trembled. "But I'll let that wait until some other time! Now give me that notebook!"

"What do you want with it, Hamlin?" Blakeley sneered. "I suppose you're interested in the money, too, eh?"

"So that's your game after all?" Professor Hamlin shot out. "You plan to capitalize Dunning's discovery? You're a dirty cad! It's none of your business what I want it for; you give it to me!"

"I'll give you nothing, Hamlin!" the secretary gritted, bolstering his courage by the fact that a number of students were gathering nearby and regarding them curiously.

"I saw you sketching the physical equipment! I know what you intend to do!" the physicist spat out a mouthful of crimson and clenched his fists tighter. "You're intending to sell us out!"

"You're a liar, Hamlin!"

Dr. Blakeley had made many mistakes in his life; but the greatest, perhaps, was when he made that last statement. The physicist's right fist shot a short distance upward and smacked under the secretary's chin with a spiteful smack. He drew his left hand up instinctively and removed the man's spectacles with a sudden, unexpected jerk. Blakeley faltered, half fell under the stunning blow and tried to leap into his car. But Professor Hamlin was not to be cheated. He grabbed the secretary's arm and hauled him from the machine. Again his right fist smacked against the other's face, but Dr. Blakeley made no attempt to retaliate.

"Just as I thought, Blakeley!" Hamlin exclaimed: "You're yellow clean through! Now shell out! I don't want to make a scene of this but, if you don't give me those papers, I'll hammer you to a pulp!"

"You'll suffer for this, Hamlin!" the secretary promised, pulling forth the scarred documents: "I'll have you removed from the faculty! You attacked me deliberately! Take the papers and be damned to you!"

He threw them at the physicist's feet, and climbed weakly into his sedan and roared off the premises. Professor Hamlin reached down and grinning triumphantly picked up the documents.

Out of Confinement

DAYS passed slowly for Marshall Dunning. For three weeks after Professor Hamlin's affair with Dr. Blakeley he had seen little of the physicist. Vague stories had floated to him concerning the affair; but the wagging of tongues had long since halted and the institution once again settled down to its work. After the first few days of confinement following the accident, Marshall Dunning seemed to be forgotten by the Institute. Except for rare visits from Professor Hamlin and the attending physician, the young scientist found time heavy on his hands and it irked him to be unable to continue his work. But he had solace in the knowledge that Professor Hamlin could carry on the work from the notes. That was why Professor Hamlin's visits were few and far between. Every spare moment the physicians could steal from his classes and consultations was spent in the laboratory working out the details of Marshall Dunning's discoveries. The young scientist was aware of that and it helped to relieve his mind.

There came a day when the physician dropped in and removed the dry, smelly bandages from his arms and face. He found them scarred and deeply furrowed from the ravages of the current that had nearly killed him. He groaned when he beheld them; but offered a silent prayer of thanks that his arms had been spared from being burned off completely. The silky surface was inflamed, red and blue, and the itching sensation was maddening; and he withstood a terrible urge to rake them with his nails. His face had not been quite so badly injured, though blue marks would remain to mar it. The gashes on his head had already healed and the scars would soon be hidden by his dun-colored hair which was well-whitened now around the temples.

"We can cover up those burn scars by skin-grating, Marshall," the physician commented as he plucked several fragments of dead skin from the youth's arm: "After the inflammation drops to normal, we'll be glad to do it for you. Of course your arms will always be more or less scarred and weak; no getting away from that. You're a lucky fellow to be living."

"I know it, Doctor," Marshall replied, biting his lips: "And I'm thankful. What's a few scars anyhow? If I ever get enough money to pay for the operation I'll let you fix 'em up, though. I'll be graduating in two more years; then I'll probably secure a job somewhere."

"Well, Marshall, your days of confinement are up, anyhow," the physician stated, rising: "I suppose you're glad, eh? But take things easy. Wash your arms well in clean, cold water. Forget about mechanic's soap for a while. The grit may injure you. And try not to bruise them. Better see me once or twice a week for the present. Good luck to you, young man!"

Marshall Dunning nodded and stared down at his red, wrinkled hands.

"Humph!" he grunted. "Could have been worse!"

Needless to say that Marshall Dunning was astounded beyond the description of words when he entered the laboratory. The wrecked equipment had been replaced by newer and more modern devices. Strange apparatus was everywhere. Huge vacuum tubes stood around compact electrical instruments. Shining electrodes, sphere-gaps, quartz balls and other scientific paraphernalia were everywhere. Hunched over a bench in a far corner was Professor Hamlin, alone. So intent was he that he did not hear the approach of the young scientist. Marshall placed a weak hand upon the physicist's shoulder. Professor Hamlin jerked up immediately.

"Glad to see you, Marshall!" he said, sticking out a grimy paw. The young man grasped it and winced under the other's friendly grip. "How do you feel?"

"Kind of shaky and low-down, professor." Marshall smiled. "Be all right shortly. The doc just turned me loose!"

"That's fine, son!" the physicist replied, wiping his hands on a piece of waste. "I'm happy to have you back. I'm stumped by this storm-busting machine of yours!"

"Doesn't it work?" the young man asked, a trace of alarm clouding his features.

The physicist shook his head slowly.

"Well—yes and no, Marshall," he said. "I've duplicated your device up to the point where the magnetic gaps come in, but I just can't detail the primary coils. Little too revolutionary for an old hand like myself. Perhaps you'd better give me a idea of it as soon as you can."

"Then you don't think we can use the device as it is?" Marshall asked: "To neutralize any kind of an atmospheric storm we'll have to create an area of non-conductance as well as stable atmospheric pressure. We've got to do it, Professor Hamlin!"

"Oh, I think it'll function, but I can't make it do so!" Professor Hamlin returned, nodding: "Certainly we've got to figure it out. You alone can do that, Marshall! I'm stumped!" He moved away from the bench and indicated to a small apparatus. "There's your storm buster, Marshall. Go to it!"

Ready For a Test

SILENTLY Marshall Dunning studied the small instrument before him. Professor Hamlin stood at his side and regarded it intently. Three quartz vacuum tubes that looked like transparent rolling pins were fitted in their sockets above the small coils. Two other tubes, the size of baseballs and as round, were half hidden in deep-set sockets. The metal base was flat and thick, the metal new and shiny. Loose wires ran from underneath the spherical tubes and hung down over the bench. Marshall's eyes trailed them and found that they were connected with the low-voltage lighting system. He tested the twin spark-gaps with his fingers and then unscrewed the upper half of one, revealing a ball-coil. Expertly he removed the coil from its appointment and studied it.

"All the ball coils made of wire of this weight, sir?" he turned to Professor Hamlin and asked: "How many coils in each ball?"

"Yes, Marshall," the physicist replied: "I used number [illegible] wire on each following 40 M coils for each ball."

"Then in my opinion, sir," the young man said, simply, "your wire is too light to withstand the shock of the stepped-up current. I believe that we have snapped the primary coils in the vicinity of the magnetic center-sphere. The breaking of the wire would not cause a short circuit, because the magnetic center absorbs the short. But I think you'll find that the trouble lies in the spark coils instead of the primaries. Suppose we rebuild these coils using number 01 wire? I think that will remedy the trouble. So far as I can see your device is exactly like mine. You must have followed my notes to the letter."

"By Jasper, I think you're right, Marshall!" the professor enthused, throwing away his waste and rubbing his hands: "We'll try it! Just take it easy and watch!"

Another week went by and, at the end of it, Professor Hamlin went to the Chancellor and made an announcement in behalf of Marshall Dunning. Dr. Blakeley, sneering behind his horn-rimmed glasses, was on hand. Strangely, he had failed to mention his affair with the physicist, though Chancellor Hobson could not have failed to learn of it. So far as Professor Hamlin was concerned, the affair was forgotten and buried, yet his love for the secretary had not been increased by any means. Hostilities had always existed between the two and from present indications it always would.

It was not long after Professor Hamlin's interview with the Chancellor that things began to happen at the Institute of Technology. There came a cloudy, threatening day when a great bombing plane, with two-inch guns mounted in parts through her metal sides, flew up from San Diego and dropped down on the Institute's private landing field. No hangar was large enough to house her, in consequence she remained in the open, her black batteries looming awesomely, her airfoils sheltering a dozen wasp-type craft belonging to some of the students.

When the bomber, *X1572,* landed on the field, the tips of her expansive airfoils had been as bare as her guns were ominously black. By some arrangement between the Chancellor and the Air Department of the government, the ship had been dispatched northward at once for Marshall Dunning's experiment. Now the dun-thatched physics student, with Professor Hamlin at his side, worked tirelessly on the erection of three small, compact, streamlined devices. Two of them had already been placed, one on the top surface of the long fuselage just afore of the towering triple tail-stabilizers; the other on the tip of the upper supporting airfoil. They saw the devices grow from a few ball-coils, nuts and bolts of beryllium, to a complicated apparatus which, the two scientists believed, would actually insure safety in flying through storm-infested areas. Now they were adding the finishing touches to the last apparatus on the tip of the left wing. Wires were being run between the three devices and joined to a central exhaust which protruded from beneath the twin tail-skids, for perhaps a half dozen feet. Observing the devices from a close viewpoint, one might have been struck with their peculiarity in the field of aviation; for they departed abruptly from anything heretofore embodied in aircraft for safety as well as gyroscopic stabilization.

Each apparatus had two sphere gaps, or coils housed within thick, steel balls, which stuck out on crescent supports for several feet over the tips of the wings. They looked like the 'eyes' of some mechanical snail; although they were rigid, held stiff by the thick stationary arms. The tail-piece sent its gaps up over the stabilizer and bent slightly downward to a safe distance from the ship's surface metals. To all three machines were connected cables that ran from a small generator capable of creating the necessary voltage housed within the bomber. The surface instruments themselves, small as they were, stepped up the voltage to the desired intensity, creating the areas of electrical neutrality and constant atmospheric pressure about the ship.

When the job was finished, Marshall Dunning and Professor Hamlin laid down their tools with feelings of utmost satisfaction, and regarded the results of their labors. They strode around the huge bomber and studied the projecting sphere-gaps, awed that their own brains had evolved such an important advancement in the field of physics. Needless to say that each took great pride in himself and each secretly showered the other with praise for having achieved the feat. Of course it was Marshall Dunning's experiment that brought the devices into being; but without Professor

Hamlin's help, friendship and vast knowledge of physics, it simply could not have been perfected, particularly at that time. And Marshall Dunning was not the type to claim the limelight, despite the fact that his brain had created the thing. So, when newspapermen were invited onto the field to photograph the bomber prior to her taking off for the mid-Pacific base at Hilo, Hawaii, Marshall Dunning refused to be pictured alone. Professor Hamlin simply must share the credits; not as a minor aid, but as one upon whom the inventor relied throughout. And the Institute of Technology shared in the honors, much to the satisfaction of the Chancellor. Marshall Dunning was indeed about to assert himself in the field of physics and at the same time prove an invaluable asset to the Institute of Technology! Chancellor Hobson realized the fact at once and congratulated the youth. He praised Professor Hamlin, likewise, for his shrewd predictions concerning the young inventor.

The experimental tests of the apparatus in the laboratorying during the next few weeks had been satisfactory to the government observers, and because of the possibilities of the thing, Dunning was being allowed to carry out his trials on a large scale.

CHAPTER V

The Take-Off

FOR days, storm warnings had been broadcast by the government warning all aircraft to shun the area of Latitude 25, Longitude 130. As a result of past experiences with storms between the California coast and Hawaii, the Trans-Pacific Company gave the areas a wide berth, despite the fact that their ships carried nothing but ballast. They sent the huge amphibians by a roundabout course that added hundreds of extra miles to the trip. Great ocean liners limped into port, telling of the terrific storms between the islands and the mainlands; but each report was looked upon as an aid to the efforts of one Marshall Dunning, budding scientist-inventor. Professor Hamlin agreed in this. And the two were as confident as the bomber's pilots were skeptical. The latter did not seem to relish the idea of sending the great ship into a terrific atmospherical upheaval just for experimentation. True, aircraft could dodge storms by changing their courses around them; but only if they had time. The disaster to the *City of Honolulu* had been caused by the almost instantaneous appearance of a storm directly in its path; and storms sometimes are hidden behind innocent looking fog-banks. But the pilots of the bomber had their orders. They would be executed—even at the cost of the ship and their own lives—for the advancement of science. Yet the pilots, hardened as they were to the peculiar antics of the air, did not relish the idea. The *X1572's* steel batteries and metal hull would be a fine conductor for even the feeblest lightning bolt!

Had they been thrown suddenly into a great aerial battle, the pilots of the bomber would not have felt so keenly uneasy; for they were drilled to combat danger. But now, as the ship raced across the landing for the take-off, their hearts were not in the experiments at hand. Yet the *X1572* banked sharply, circled the field once and sudded across the heavens like a frightened bird. Her great, sixteen-cylinder radials roared mighty defies at the elements which lay in her course. She screamed through the air on a southerly route and vanished presently into a high-hanging fog bank, miles off the Coast. For seconds after she disappeared, the Chancellor and his faculty, newspapermen, scientists and the curious public could hear the thunder of her great motors and the hiss of her "props." Then the landing was deserted and the world settled back to await the results of man's most strenuous fight with the infinite!

Those within the rather limited confines of the huge bombing machine felt the entire range of human emotions as the daring craft sped westward and, sometime later, got her baptism in a semi-tropical deluge. She had entered at last the distant fringe of a terrific storm whose center of greatest strength lay yet some hundreds of miles ahead. Flying blind by inductor compass only, the *X5172* had long since lost sight of the heaving billows of the Pacific some 30,000 feet below. She tore along through the deluge and bumped her way over dangerous down-drafts like a half-filled bottle in a sea of rolling oil. But Marshall Dunning and Professor Hamlin were not yet ready to throw into operation the storm-neutralizing instruments they had erected on the ship's wing-tips and tail. Nor were they actually enjoying the experience, as it were.

Unaccustomed as he was to air travel, especially under such conditions, Marshall Dunning found himself suddenly sick and nauseated from the terrific lurchings of the ship. Professor Hamlin, as he squatted beside a port behind the main gun turret, felt considerably ill at ease. The *X1572*, built for the needs of aerial warfare lacked space for comfortable cruising under its present over-crowded conditions. In the main cabin, like the interior of a submarine engineroom, were the mechanical controls of the huge aerial battler, allowing only a narrow alleyway between two rows of apparatus. The air here was hot and stifling and the "black gang" sweated. Machine-gun turrets congested the forward cabin; these were merely cylinders of steel which rose from the bottom of the hull up through the top. Triple guns were mounted within so that they could be swung on gimbals under the protection of the armor-plating. Nothing less than an inch shell could penetrate the cylinders and even them a straight hit was unlikely; so that the gunners confined within had a high degree of security. And should destruction overtake the ship, those in the gun turrets releasing their parachutes could press a lever and drop through the bottom to safety.

All in all, there was too little room in the bomber for comfort even under the most pleasant conditions. Besides her ordinary crew of twenty-five men, including a galley artist, every inch of available space was consumed by a few privileged newspaper men, two Air Department authorities, a meteorologist, Marshall Dunning, Professor Hamlin and Dr. Blakeley. The secretary, being the official scientific recorder for the Institute of Technology, was detailed against his protests to accompany the experimental flight.

Squatting in a sheltered corner, oppressed by nausea, Professor Hamlin looked over at his erstwhile physical opponent. Dr. Blakeley's face seemed to have lost its usual sneer and also some of its arrogant expression. Behind his horn-rimmed spectacles his eyes rolled with a deep-rooted fear as the ship suddenly dipped into solid sheets of rain, wobbled and plunged headlong into a forty-five degree dive. He clutched at a railing to steady himself as the *X1572* righted herself and banked like an eagle flying against a head wind. Professor Hamlin managed to grin and winked at Dunning who was conversing steadily with a smiling reporter. Young Dunning was experiencing his first interview, much to the delight of the reporter. The latter was indeed getting a real story—one that would place him on the

list as a first page writer for a long time to come!

Into the Storm

PRESENTLY the bomber heeled under an upward pressure and soared skyward like a rocket. She stood on her laterals for a long minute and then struggled to even keel as the greatest storm in history smote her head on! Long tongues of lightning flicked out from behind rolling masses and illuminated the heavens with a ghastly glow. A singing bolt shot perilously close to the *X1572*. The radials seemed to shudder under the force of the terrific air pressure and sputtered, threatening to die out entirely. A man, sweat-covered and grimy, yanked at a reserve throttle and threw into operation a dual-ignition system. The other had accepted some of the bolt's current, with the results that the outlet coils had snapped off at the terminals. Instantly the radials roared again in perfect rhythm and the bomber lifted herself out of a threatening tail-spin and levelled off into the terrific upheaval. Tons of water smashed with a roar on the ship's metal surface; then those inside became aware of a different sound—a more dreadful note coming from without. The rush of water seemed to cease suddenly and in its place a rapid, staccato vibration overcome her. It became suddenly cold within the *X1572* and every man found himself shivering to the marrow of his bones. There was one whose coldness was overcome without any extra effort, however, and that man was Dr. Blakeley; he was too frightened to notice the cold. He appeared on the verge of prostration as the bomber heeled again at a terrific angle and plunged, her tail swinging in great circles. He clung like a madman to the railing and lay inert when she flattened again.

Professor Hamlin gasped as he peered through a porthole at the sight. The air on all sides seemed to be a solid mass of gray and white. A barage of hail came down now and so suddenly that it was awe-inspiring. Neither Marshall Dunning nor Professor Hamlin, nor any one else had suspected the presence of hail so far south; but freak storms have always happened—always will. Nor did either of the scientists have a chance to throw into operation the neutralizing apparatus before the storm struck. Thanks to the stoutness of the *X1572*! An ordinary ship like the *City of Honolulu* and others of its type would have crashed to destruction under the first onslaught of such a hail attack. But the bomber was being tested to the utmost; for, virtually at the same second when Professor Hamlin turned on the current that sped to the storm neutralizing devices, a sheet of hail smacked along the blades of the aerofoils with a terrific roar. Even as he watched through the port, Professor Hamlin saw the surface plates rip along the right wing, starting from the leading edge. Then the plates swung backward with a crash, tearing the metal as though it was a scrap of tinfoil. It left a gaping hole in the surface covering midway between the fuselage and the neutralizing instrument on the tip of the wing.

Scarcely had Hamlin turned on the current when a sudden bolt of lightning swung across the skies. The *X1572* shuddered as it roared by. Instantly one of the radials exploded in fragments. It created a purplish glow within the control room and a man, unfortunately, had been caught with his hand on the control of that one radial. He was hurled into a corner, a broken, inert thing, face blue, lips twisted in death. Under the force of a sudden downward draft the *X1572* was caught in the grip of the pressure that held tightly to her torn right airfoil. She slewed over sharply and began a barrel roll that threatened to rip her to shreds. By some miracle she straightened with a sudden jerk that jerked the necks of those within her. Then suddenly the tips of the bomber's aerofoils began to glow as the storm neutralizers went into action. Long jagged sparks leaped between the sphere-gaps from one instrument to the other in a great triangle. As the current was gradually stepped up from the low voltage of the small generators, the bomber seemed to be in the center of a hollow shell of pale-blue fire.

As though the sun had suddenly chosen a single spot to concentrate its violet rays upon, the area surrounding the *X1572* became free of atmospherical turmoil. The storm, raging on all sides just beyond the collar of the glow, appeared to have no effect upon it now. Flickering lightning, singing down out of the heavens with malicious intent was shunted along its surface when it encountered the protecting envelope that cradled the bomber. Sheets of rain flashed in luminous arrays on the fringe of the artificial photosphere, the devastating wind whistled by passing harmlessly over and under. Loud peals of crashing thunder sounded on every hand. Livid streaks of lightning ripped the heavens wide. Masses of whirling storm clouds, twisted in grotesque formations, lay directly ahead in the core of the upheaval. To those within the ship it appeared that the heavens had put forth its every-known element to combat this man-made bird that hoped to conquer space. And into it moved on the *X1572* wrapped in a ball of violet luminosity.

As the bomber raced into the whirling maelstrom, the pilots struggled to maintain her on an even keel in spite of the gaping hole in her right upper aerfoil. The center of pressure upset, the machine careened far to the left to combat the powerful pull that embraced her and kept her flying in a straight line. Then as though she had entered the fires of hell, the *X1572* swung into the very core of the storm. The heavens were ablaze with lightning, flashing long, jagged streaks in constant array. Livid tongues shot from behind black thunderheads and the following roars crashed down upon those within the ship, threatening ominously to crack their eardrums. But the violet glow, the sphere of luminous protection, followed the bomber until suddenly, for some reason, the instrument on the right wing tip flashed and went dead. Instantly the bomber was in the midst of destruction.

Destruction Ahead!

POWERFUL winds embraced her and spun her into gyrations like a drunken, helpless thing. She whirled and twisted and stood on her tail, threatening momentarily to plung downward in a spin from which there could be no recovery. Beyond the dim light cast through the ports from the lighting appointments withing the cabins, the heavens were blacker than the pits of Hades except when the vivid blue flashes from the lightning displays revealed the airfoils. Far out on the right wing Professor Hamlin and Marshall Dunning, peering into the black, beheld a long streamer of cable whipping in the win. The young physicist at once snapped the current from the storm neutralizers and regarded the stern features of his friend, Professor Hamlin.

"Looks like we're done, Professor!" he said, hanging his head: "When that plate ripped off the wing it must have sawed into the cable connecting the instrument with the others, Must have taken a little wind and vibration to break the contact and throw the whole system out of commission. There's no way of repair-

ing it in this storm!"

Professor Hamlin put a hand on the dun-thatched physicist's shoulder and shook it.

"We haven't cracked up yet, Marshall!" he said: "Until we actually do so there's always a chance. Perhaps the other two instruments will help us get out of this storm to where we can climb out on the wing and splice the cables."

Marshall Dunning looked up and grinned, his hopes rising.

"Let's try it anyhow!" he said, yanking a pair of pliers from his hip pocket and severing the right wing cable close to the source of current generation. Professor Hamlin bound it with tape and bent it over out of the way. He switched on the current again as Marshall walked to a left port hole to watch the results. Instantly the instrument on the left aerofoil tip began to glow. Then a flash leaped across the gaps. A jagged streak of glaring artificial lightning crossed his vision as the gaps between the functioning instrument and the one on the tail became alive. At once the violet glow assumed its spherical shape again but the sphere seemed to have been cut in twain for it was invisible on the right side. The storm beat with all its fury upon the unprotected right airfoils and the ship lunged sharply to the right, as though a great weight had suddenly been placed upon the tip. Unprotected on the right as she was, the *X1572* began a whirling, circling motion with the tip of its right wing held down, allowing the left to move around it in great circles. Rudders hard to the left failed to relieve the situation. Then the pilots, suspecting the cause, yelled through their communication tubes for a decrease in radial revolutions, or the motors on the left. Nor did this have any effect upon the ship other than to cause its velocity to decrease and the ship itself to lose altitude. Little was left to do but to throw off the current between the two functioning instruments, lay tail to the wind, and fly before it as best as they could. But like Professor Hamlin and the others, the pilots were well aware that hundreds of miles of danger lay on every hand. (It would take several hours to reach the rim of the storm even scudding ahead of a gale, and many things can happen in a few hours especially under existing conditions. To fly with the wind meant one thing; they would have the storm with them until it exhausted itself or they plunged into the Pacific as the *City of Honolulu* and many others before it had done.

No getting away from it; the *X1572* was in a perilous situation indeed. With two perfect airfoils she might have weathered the storm. But with a torn right wing, and the wind blowing a gale of destruction into the hole, was a vastly different thing. And taking everything into consideration, knowing that with perfectly-functioning storm neutralizers, the ship could nullify the storm in its immediate area, Professor Hamlin called the commanding officer of the *X1572* into a conference. Dr. Blakeley, white-faced and afraid, stood in the circle that knotted around Professor Hamlin and Marshall Dunning. He watched every expression that crossed the face of his old-time enemy. There was nothing hostile in the secretary's attitude now. That had fled long since in the face of what seemed the inevitable.

"Gentlemen," Professor Hamlin said, evenly, scanning the tensed features surrounding him: "You will have to concede that Mr. Dunning's storm-neutralizing devices have proven successful beyond doubt. Every one of you witnessed the protecting envelope which they created around the ship, neutralizing the storm that has been thundering on every hand. You are aware that the hail ripped a gaping hole in the right aerofoil, causing the cable of the neutralizing instrument there to snap and throwing the entire system out of operation. You all know that under present circumstances things look mighty bad for us. I have a plan in mind that may save our lives, prove our inventions are what the world seeks, and bring the *X1572* into Hilo safely. But to do what I have in mind, one of us will necessarily have to give his life, perhaps, so that the others here may live. I nominate myself for that work—I'm going to climb out on the right airfoil and re-cable the neutralizer!"

Marshall Dunning's face paled.

"It's suicide, Professor Hamlin!" he said: "For you to attempt such a thing will mean certain death! Remember you have a family. You can't do it, sir! I'm younger, stronger and footloose! Let me—"

CHAPTER V

Choosing the Victim

THE elderly physicist placed a rigid hand on Dunning's shoulder and shook his head

"No, Marshall!" he said, warmly: "Your arms have not yet regained their normal strength. You could not keep yourself from being blown from the wing. Moreover, you could not splice the cables with numbed hands! My plan is for you to attach ropes around me so that, if I am blown off the airfoil, you can haul me back in the ship again through the observation hatch. Let us not waste time arguing, gentlemen! It must be done now—the right neutralizer must be put into operation or the storm will crush this ship like an eggshell before many more minutes!"

"Professor Hamlin," said Flight Commander Maxwell: "As commanding officer of this ship I refuse to permit you to take such a risk! Any one of my crew could crawl out there, do the splicing, and return safely; personally I can perform the feat. Either step aside and allow me to go out, or draw straws for it. Every member of my crew is needed at his post. The man who must splice the cable will have to be chosen from this group!"

"Then we'll draw straws, Commander!" the scientist replied resignedly.

Commander Maxwell pulled half a dozen matches from his pocket, nipped the end of one with his teeth and shuffled them. He ordered the newspaper men aside despite their protest, and passed the matches for selection, holding them tightly between his thumb and forefinger so none could see which was the shortest. The two government officials selected theirs. Commander Maxwell chose one and held it in the palm of his left hand, unseen. Marshall Dunning made his selection; then Professor Hamlin. They held the sticks hidden in tense hands. One more remained; wide-eyed, his face a pasty color, Dr. Blakeley reached out with a trembling hand and plucked it from the officer's fingers. Shaking like one palsied the secretary stared at his selection for a long time, his lips muttering meaningless sounds.

"Gentlemen," Professor Hamlin said suddenly: "I've won! Here's my choice!"

He held his hand out and in the palm of it lay a shortened match stick. Commander Maxwell peered at it closely and shook his head.

"No you don't, Professor!" he snapped: "You broke the match yourself! I saw the tip falling to the

floor! Here—" He plucked a fragment of wood from his lips and held it out for all to see: "I have the piece from the match that I nipped with my teeth! It's a game action by you, sir, to do that, but the man who selected the short match must step forward like a man! Who has it?"

All eyes roving around the tensed group finally settled upon Dr. Blakeley. He stood staring down at a sliver of wood lying in the palm of his trembling hand. It had been nipped off by the sharp teeth of the commander and it was still damp at one end. Presently he lifted his eyes and met the penetrating stare of Professor Hamlin. He flinched visibly and to the scientist's utmost amazement, his shoulders suddenly squared and he stepped forward.

"Hamlin!" he said, handing the match to the officer: "There comes a time in practically every man's life when he must defend his honor or forever be hounded by the curse of cowardice! I've been a yellow all my life, Hamlin! I've been a dirty cur barking but never biting because I am a coward. I've been waiting for a chance to get even with you for some imaginary grievance. What it was I don't know! But I—I'll go out on that wing and splice that cable! If I die—if I'm blown off—then the world will know that I went out like a man. If I live I hope you will forgive our past animosities and be my friend! I am ready, gentlemen!"

If Professor Hamlin and Marshall Dunning and the others had been struck by lightning they could have been no more electrified; though only Dr. Blakeley's two associates understood the meaning of the secretary's words. Professor Hamlin, studying the features of his erstwhile enemy, felt that there was something tragic in the words uttered by Blakeley. Though the man seemed to have discarded his cowardice, the physicist knew that the secretary was waging a hard battle with himself. To go out on that airfoil under the conditions was indeed a heroic thing. Death seemed inevitable. Even with ropes to prevent the man from falling to the hungry waves far below, the chances were ten to one that the terrific air currents would dash him from the wing and crush his body against the metal side of the fuselage! Only a miracle could save him. Whether Dr. Blakeley realized all this in making his decision nobody knew. By the manner in which he donned a heavy, fur-lined aviation suit, one would have accepted him as a man well acquainted with such things as crawling out on airplane wings in crushing storms. He seemed nonchalant in the face of death. Perhaps Dr. Blakeley did have a better side, a finer heart, that had suddenly asserted itself. It has been known to happen. And usually it asserted itself under similar conditions as this. Only the hand of God can give to a cringing coward a fighting heart.

As he donned a padded helmet preparatory to forcing his way through the observation hatch to the right wing of the bomber, Dr. Blakeley's lips trembled. But he stiffened as Professor Hamlin managed to reach his side across the alleyway of the plunging, rolling plane. Hamlin saw that the secretary's eyes were actually moist.

On the Wing!

"BETTER let me go out, Blakeley!" the physicist whispered, bending close to the secretary. Dr. Blakeley shook his head firmly.

"Thanks, Hamlin!" he replied, regarding the other speculatively: "I won the job and I'm going to do it! I want to apologize for my past actions before I go, Professor. There are others, too, whom I'd like to say a few words to, but I'll have to let you say them. Everybody who ever knew me will say I was a cur! I hope this experience will change my entire aspect on life. If I live through it I'll try to make amends for my past."

"That's being mighty white, Blakeley," the physicist said: "I wish you luck, old man! When you get out to the instrument grab hold of that flying cable and lash it down to one of the motor supports. You will be dragging another cable along with you and when you get them lashed down splice them together. We'll be ready to help you back into the ship when you signal by a wave of your hand. Hold on tight to the motor stanchions as you go along. Shake, Blakeley?"

His eyes still moist but flashing, Dr. Blakeley reached out and grasped the hand of Professor Hamlin as Marshall Dunning coiled a heavy manila line around his waist and tied it in a triple-square knot behind him. The secretary turned and faced the dun-thatched student.

"You're a man, Dunning!" he said, simply. "You're the greatest asset the old Institute has ever had. I hope you go a long way, young man!"

"Thank you, Dr. Blakeley, good luck!" the youth said, peering into the other's partly-covered face.

There was something pitiful in the appearance of Dr. Blakeley as he mounted a short flight of grated steps up into the observation compartment. Climbing behind him, Professor Hamlin reached up and grasped his ankle, giving it an assuring squeeze. The secretary grunted softly in acknowledgment and crouched on the top platform ready to ease himself out into the writhing elements when the hatch swung open. Flight Commander Maxwell stood at his side, crouching, and with a heave, shoved the hatches upward. Balanced by weights they opened easily enough; but the wind smashed into them spitefully. Dr. Blakeley gave him a hand and they locked them open. A sudden deluge of water poured in, drenching them. Wind shrieked an ominous song through the opening and pounded those within it, downward. The great drafts from the racing airscrews thrusting a terrific wind pressure backward, all but tore Blakeley from his position. A terrific deluge lashed him and threatened to tear him to shreds. He turned his head sideways to catch his breath and then with a slow, mighty pull upward, he left the compartment and began crawling along the top of the fuselage toward the center motor supports, dragging the cable and life-line with him.

As he played out the lines, Professor Hamlin offered a silent prayer that this man might succeed in his efforts and be returned safely. The *X1572* heeled into the wind dizzily and dipped her nose downward. But the pilots held her up stubbornly. Long streaks of lightning played through the heavens. Bolts roared perilously close, at times creating a deathly glow over the outer structures. In Stygian blackness, Dr. Blakeley snaked his way across the surface of the bomber. He hugged it close, face flat against the ice-coated metal to protect himself from the stinging blasts. Snaking his hands forward along the corrugated surface for a hold on something to pull himself ahead, they encountered the jagged edges of torn steel. When one of the radials had exploded, fragments had penetrated the bomber's structure, leaving needle-pointed barbs sticking upward. Unmindful of the gashes his palms received, he crawled tensely, expecting momentarily to be hurled into the foaming depths below. With each sickening plunge of the *X1572* he felt that his end was at hand. But strangely he felt no fear. When the

ship suddenly encountered an air pocket and dropped several hundred feet on even keel, he felt his stomach churn. Swallowing hard he finally reached the central motor stanchions and paused for breath.

After a moment's waiting, clinging tightly with one arm locked into the support's weight-reducing holes, his shoulders perilously close to the whirling props, he pulled a flashlight from his jacket and sent a thin beam of light along the right airfoil. He returned it to his pockets again and began to wiggle forward, lying flat on his stomach, arms outstretched between the stanchions. Great displays of fierce, awe-inspiring lightning illuminated the blackened heavens. Through it he saw the tip of the airfoil seventy-five away. The small, compact storm neutralizer was there. He had to reach it. And he began to realize that the most dangerous part of his journey lay between the last radial and the instrument. Between the two existed a bare surface a dozen feet across. How could he get over it with nothing to support him, not even the slightest hand-hold? Well, he thought, wiggling forward, he'd worry about that when he came to it!

A peal of thunder crashed down. Dr. Blakeley instinctively hugged the surface. The bomber's structure trembled under the terrific vibration. He closed his eyes waiting for the ship to plunge. But something more powerful than the elements seemed to hold it aloft. After tortuous seconds he went on again. Perspiration made him uncomfortably hot despite the sharp chill of the rarefied air and the ice that coated the ship in a thin, slippery sheet. It was raining; but it was a cold, icy rain that soaked through to his body through the fur-lined costume he wore and frosted the material into the ice. But Dr. Blakeley was not aware of that. His efforts were so powerful against the shrieking wind that the freezing of his clothing to the ice was unnoticed. He had to exert all his strength to wiggle an inch!

The Rescue

EVENTUALLY he found himself clinging to the end radial. A dozen feet away lay the useless neutralizer. He heard the snap of the flying cable even above the whine of the wind and the crashing of the thunder. The cable was snapping like a whip as the wind held it out behind the wing. Gripping the perforated radial supports, he searched for his flashlight. Locating it finally, he flashed a ray of light forward toward the wing-tip. Before him lay the gaping hole that had been ripped in the airfoil by the hail. Perforated braces lay exposed and his heart leaped. Reaching outward he grasped a brace and swung himself into the hole where he lay for an instant, panting. The wind tugged at his costume and whined a frightful song of death around his throat. He buried his face in his arms to avoid the cutting sting of sleet and rain. Flesh clung to the sleeves when he lifted his head again, but he did not feel the pain. His fingers, long since deadened by the ice, seemed like things of bone. They were cut and torn and the blood was frozen upon them. Dr. Blakeley had long since lost all fear of death. In his mind was one uppermost thing now. That was; he must reach the neutralizer, pull in the flying cable and splice it to the one that he drew behind him. He reached around instinctively to feel its presence. The cable was still there were Marshall Dunning had fastened it. And the lifeline was taught. He laughed insanely as he touched the hemp.

The journey across the intervening distance was one of terrible torture for Dr. Blakeley. Jagged edges of the torn metal snagged at his jacket. The straps which held his overall-trousers tightly bound around his ankles had whipped loose. Frequently they caught on jagged steel and he jerked them loose, leaving flesh and blood on the obstacles that held him. He stopped again and flashed his light. So rapidly had he traversed the treacherous area he had at last reached the neutralizer before he was aware of it. Another mighty jerk would have carried him beyond it and sent him hurtling from the wing to what?—to death! He paused to laugh hysterically at the thought of death. How welcome it would be as a relief from the burning pain of his wounds! But Dr. Blakeley was not yet ready to die. He had a mission in life to fulfill before he left it. With that thought singing loudly in his brain he grasped a metal brace with a nerveless hand and leaned far out over the wing. A sudden air current caught hold of him and almost pulled his grip loose. But his hand was clamped to the brace and refused to be torn loose. Bone and sinew held his weight and the force of the elements tugging at him. One leg slipped over the lateral lift. He felt it sliding and with a superhuman effort he managed to climb back again. Almost exhausted, he ran his hand along the side of the neutralizer for a chance feel of the cable connection. He felt a rise on the steel casing of the device. That was all. He knew it was the cable connection because beyond it the neutralizer's surface was flat. His hand traced along the cable for inches and then he clamped his frozen fingers upon it.

Slowly, very slowly he drew the wire to him, coiling it under his body. Seconds passed like eternal centuries and presently a flash of lightning revealed the end of the cable within his reach. He grabbed at it and drew it under him, mumbling like a deranged mother over the body of a dead babe. Great sobs escaped his cracked, frozen lips. With something akin to rising joy in his numbed body, Dr. Blakeley edged his way back into the jagged hole. Pausing to thrust the cable through one of the perforations to hold it down, he clung in a grip of death with his legs hugging the braces. After what seemed hours of excruciating punishment, he reached the protection of the radial supports again. With his legs wrapped around them he lay on his stomach and slowly spliced the two cables together. His hands, deadened to touch, were almost useless; yet somehow he bound the cables together and taped them firmly, securing them to the stanchion to which he clung. A terrific flash crossed the heavens and its accompanying crash of thunder smote him like a hammer. The radials missed as one on the left airfoil developed a short. Stunned into insensibility, Dr. Blakeley's form sagged. His legs, clamped around the support, loosened. The *X1572* went into a nose-dive and plunged in sickening whirls downward.

With his head and shoulders protruding above the open hatch, Professor Hamlin saw Dr. Blakeley's flashlight slide out of his pocket as the bomber plunged. The light, sending a feeble ray into the darkness, rolled off the wing and vanished. With a shout, the physicist began hauling in the lifeline. It gave a sudden jerk that nearly tore it from his hands as the secretary's body lurched off the airfoil and hurtled downward to the end of the hemp. Instantly those at the ship-end of the line began to haul it in frantically. Dr. Blakeley's inert body swung like a great pendulum under the fuselage as the ship straightened and the storm neutralizers began to glow. Keeping constant vigil over the man whose enmity had made his life at the Institute of Technology anything but happy, Professor Hamlin

had watched the process of cable-splicing. Dr. Blakeley had kept his flashlight glowing while he worked. He had finished just as the bolt struck the radial. Marshall Dunning, at the physicist's command, had instantly turned on the current into the three neutralizers. And, now, the huge bombing ship rested easily again in the protecting envelope of the violet atmosphere. Like a miniature plane in a glowing soap-bubble, the *X1572* scudded through the storm on an even keel! The elements were neutralized!

The End of the Flight

WHETHER life had flown from Dr. Blakeley's body they could not know until he was returned to the ship. Gently now they hauled in the lifeline. Dr. Blakeley was a heavy man; but a dozen hands were pulling in the line. Rapidly the hemp was drawn in through the open hatch and presently Professor Hamlin was seen to reach outward and grip the jacket of the limp form of the secretary. Eager hands rose to help lower him into the ship. Apparently dead, he was placed at once upon the floor between the machine-gun turrets. Those who beheld his torn flesh shuddered. But Professor Hamlin, aided by Commanded Maxwell and Marshall Dunning, bent over him at once, chafing his bloodless hands. His face was unrecognizable. His cheeks were frozen until the flesh was cracked and swollen. Flesh had been torn from his fingers and palms and his nostrils were plugged with ice that was slowly, very slowly melting in the warmth of the room. Dr. Blakeley was not yet dead; but so close to it that Professor Hamlin was alarmed. The man's heart fluttered weakly, but it was beating nevertheless. Discovering the fact, the physicist and the others worked over him feverishly. Pure alcohol was taken from the ship's medicine chest and applied to the secretary's frost-bitten body. He was rubbed unmercifully by eager hands. Presently his eyes opened, and he stared about him in mortal terror.

When the United States Army bomber *X1572* landed at Hilo, hours later, Dr. Blakeley was stark, raving mad. Delirium had embraced him as the bomber raced through the raging elements under the protection of her violet globe of atmospherical neutralization. Professor Hamlin and Commander Maxwell had been forced to tie the secretary in a narrow bunk to prevent him from injuring himself and the others. Insane, he had raged until the commander administered an injection of narcotics. Now, as he was lifted from the ship into a waiting ambulance for which Commander Maxwell had radioed ahead, the secretary was raving again, his mind totally deranged. Hardly had the doors of the machine been closed than it tore off the field and raced toward the base hospital.

Breaking away from the throngs of people and persistent newspaper men, Professor Hamlin and Marshall Dunning followed the ambulance. Press men trailed after them, snapping photographs, grinding off reel after reel of film. But the two refused to be interviewed until an hour later, they emerged from the hospital and informed the world that after a few weeks of rest, Dr. Blakeley would not be much the worse for wear, beyond the loss of several frozen fingers. They told how the secretary had saved their lives by his daring feat. Professor Hamlin paused to point to Marshall Dunning.

"There, my friends," he said, smiling, "stands the man to whom the entire world is indebted! Mr. Marshall Dunning, the world's premier storm buster! Mr. Dunning's research has made it possible to neutralize the elements, so that future aviation need not fear the terror of storms. He has conquered everything that natured has placed in the path of man's conquest over the air! To him goes all credit. I have acted merely as his lieutenant in the matter of making the air safe for man and his mechanical birds. He really doesn't look it, gentlemen, but Marshall Dunning is without a doubt the greatest physicist the world has ever known. These are my statements; publish them as such!"

Marshall Dunning's features flamed. Awkwardly he ran his scarred hands through his dun-colored hair and stammered for words.

"Don't believe him, gentlemen!" he insisted. "While I lay in bed, taking life easier than Riley, Professor Hamlin constructed the storm-neutralizing instruments. It could not have been done without his invaluable skill. As for being the world's premier storm buster, I assure you that I have been scared almost to death all the way over from the States!"

The reporters guffawed loudly, not at anything Marshall Dunning had said, but as a result of his embarrassment.

"How about the United States government, Professor," inquired a serious-faced reporter: "Did they purchase the storm neutralizers?"

The other reporters listened eagerly for the reply. It would be news no matter what the answer was.

"The two government representatives with us have stated emphatically that the United States will purchase all rights to the instruments, gentlemen," Professor Hamlin said: "Moreover, the government's reward for the achievement, along with the rewards offered by the other nations of the world, will go to Marshall Dunning and myself. We have agreed that half of this staggering fortune will be given to the Institute of Technology at Pasadena to form the Marshall Dunning Appropriation for the Advancement of Physical Science."

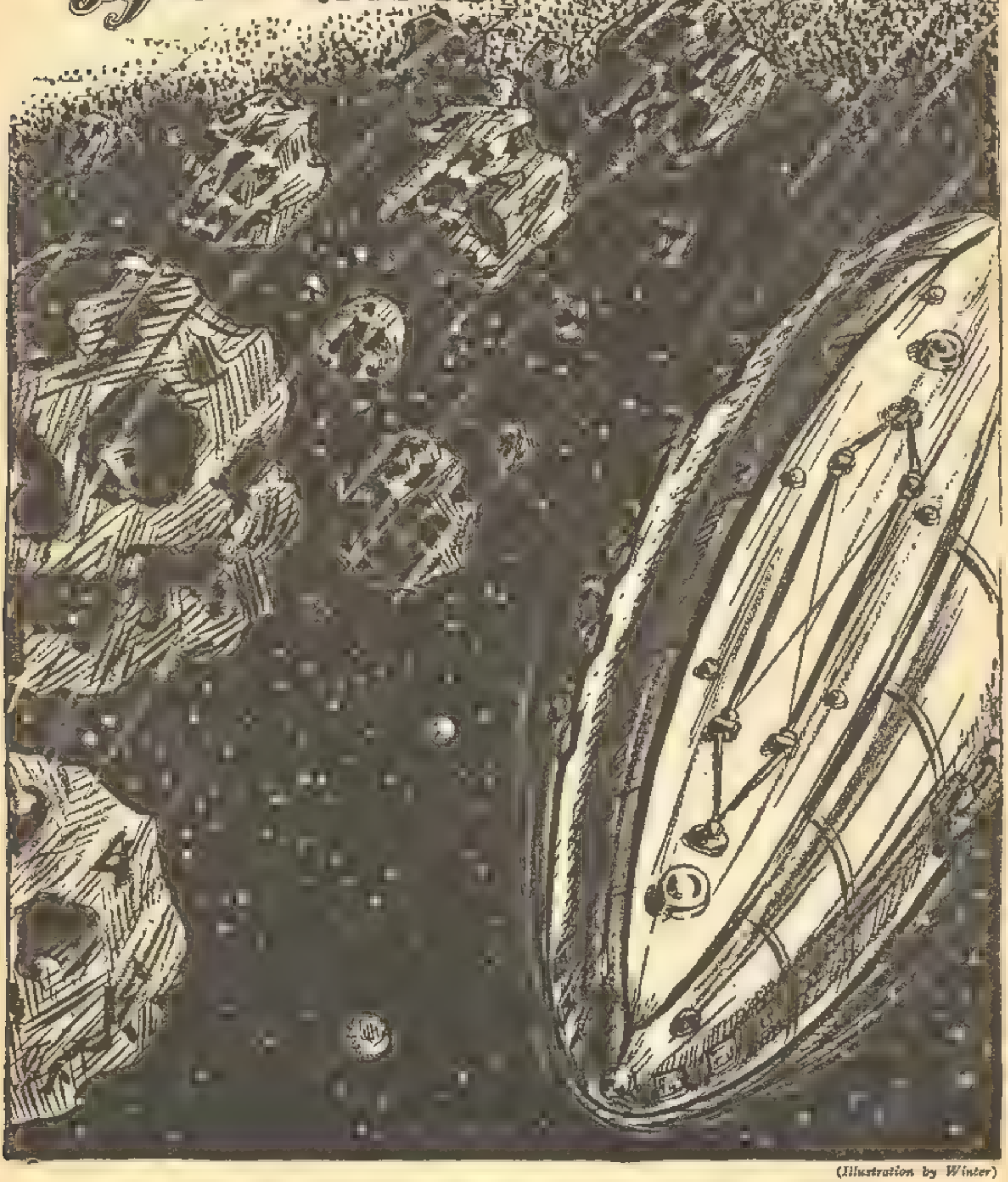
They posed for another round of photographs, spoke a few words into a battery of microphones and then retreated into the hospital again to await the time when they could see their friend, Dr. Blakeley. And it need not be said that aviation was again re-established on a firmer basis than it ever had been before! No aircraft of any type thereafter would be complete, and approved by the Department of Aeronautics until it was equipped with the Dunning Storm Neutralizers. As a result, man at last conquered the air!

And Marshall Dunning rested content.

THE END.

The Death's Head Meteor

by Neil R. Jones



(*Illustration by Winter*)

The head was composed of three huge meteors better than two hundred feet thick, with rough sides resembling miniature mountains careening through space. In the wake of the first three came smaller ones.

THE DEATH'S HEAD METEOR

HIGH up, on the top floor of a hundred-story building sat a man at a desk. Before him was an array of dials, a system of switches and intricate electrical appliances. Several hundred glass bulbs of various sizes flashed on and off intermittently in the wall over his desk. Fitting over the top of his head and around his ears was a shining, silver cap with a wire leading from the top to the apparatus before him. He was one of the world's interplanetary radio operators of the twenty-sixth century, sending and receiving daily messages between Mars and the Earth.

One of the largest glass bulbs suddenly shot into brilliance, and with a fierce crackling, an electric spark closed the gap between two metal cylinders, which paralleled one another about a foot apart. At the same time, the operator leaned forward, and with practiced hand, quickly manipulated several of the dials to various points, after which he threw one of the switches into place. A low droning sound filled the room, and a large cylinder upon which was rolled a continuous sheet of thin aluminum began to slowly revolve. As the brilliant blue-white flare in the glass bulb died away, the droning noise turned to a high keyed whine which broke off abruptly. The cylinder stopped while the multitude of tiny glass bulbs again glowed separately at intervals, as they had been doing just before the message had come in.

The operator shoved a lever at his side, and a small roller cut across the large cylinder, releasing a sheet of the thin aluminum which fell on to the desk before him. Cut through its thin metal texture was the message from Mars in the three universal languages of the Earth. The radio operator now turned his attention to a smooth plate which rested in the shape of a semi-circle about two feet long and half as wide. On the flat side of the thick composition plate, a black screen arose several feet in a vertical plane at a right angle to the plate, so that the screen faced the operator. Placing the aluminum sheet upon the plate, the operator threw another switch, simultaneously pressing a button marked "Meteorological Bureau." The screen suddenly glowed, throwing a series of orange-hued rays on a slant down upon the plate bearing the narrow sheet of aluminum which grew indistinct, finally fading, until it disappeared from sight. The radio man threw back the switch once more and the screen grew black again The plate was now as empty and bare as before he had laid the message upon its surface.

In the Meteorological Bureau, two thousand miles away, the officials read the message from the aluminum sheet which had been transmitted by radio. One of them, an elderly man, walked over to the end of the room, the wall of which was bordered into a squared shape by panels. The color of the wall inside the dark panelling was a dull gray. He advanced to a round, metal, inlaid section of the floor. As soon as his feet came in contact with the metal, a picture suddenly flashed upon the surface of the wall, and the sounds of exclamations and loud laughter broke in upon his ears. The elderly scientist was looking into a comfortable room fitted up with lounges and easy chairs. Four young men were the sole occupants, being engaged in a game at one of the tables in the room.

The game ceased as the four came to sudden attention, facing their superior who now spoke.

"Jan Trenton."

"Here, sir."

"Get your ship ready for instant duty. I have a message from the Martian observatory at Fomar which states that several large meteors are approaching from the region of Jupiter and the asteroid group. It states that they will pass close to Mars to-night at 23:43, Earth time, two hundred thousand miles above its South Pole. From past experience, you know what is required of you. Bring back samples for the Bureau to analyze as well as any precious stones or metals you may discover."

The scientist turned towards his companions once more, and as his feet left the metal section of the floor, the picture immediately disappeared and the television screen was once more replaced by the somber, gray color.

At the space ship base, in the same huge city which held the Meteorological Bureau, Jan Trenton prepared for his trip Getting into a private elevator, he propelled himself at a dizzy speed up through the interior of the tall building to the roof. The last five stories were open air landing bases for the aircraft and space flyers. The first level was for the air flyers which plied among the ports of the Earth; the second was reserved for space ship freight carriers going to and from Mars; the third housed the freight ships which worked between Venus and the Earth; while the fourth was left to passenger service between the Earth and the two planets. The top landing level was used for miscellaneous purposes, the Meteorological Bureau.

NEIL R. JONES

SLOWLY the human race is emerging from its earthbound traditions and is casting its eyes towards the heavens. It was not so many years ago that weather changes were little understood, and there was much misinformation connected with them during the past twenty-five years. We have just begun investigating the atmospheric ocean, and we are slowly arriving at a point where long range forecasting becomes possible.

As soon as our activities are extended beyond our earth it will become necessary to send space flyers to chart the open spaces for scientific research. It is already known that the space between the earth and the sun contains a good deal of foreign matter, such as meteors, and even immense meteoric dust clouds. These, in cutting off the radiation of the sun, exert a tremendous influence upon our weather conditions. Furthermore, such meteors may contain strange and valuable elements. It is the exploration for such things that our author has used as a basis for his aviation story of outer space. And, incidentally, it is a story which will keep you on the jump right through.

controlling a section of it for their use.

Off Into Space

AS Jan gained the roof, he found everything hustle and bustle, with space flyers and terrestrial aircraft coming and going. He went to the hangar of the Meteorological Bureau and entered. A long line of small space flyers stood side by side. Like the larger space ships, they used the same means of power, that supplied by atomic energy. A terrific speed could be obtained in outer space, and the fantastic speed of the Earth and the other cosmic wanderers of space might well be likened to the space flyers as the speed of a turtle is compared to that of a jackrabbit.

The young astronaut approached his tiny space flyer. It was shaped like an egg, except that it was more elongated, and the two ends tapered down to blunt points instead of being rounded. It was mounted upon four revolving metal spheres set into its keel instead of wheels as landing gear. It was especially adapted for the use of exploring meteors, for all sides were studded with grapples and jointed drills as well as claw-like iron rods. These latter, which were also jointed, were capable of acting in the capacity of fingers in grasping material and placing it into the receptacles which lined the sides of the little space car. All of the exterior apparatus was manipulated by mechanical control from within.

Jan inspected his oxygen tanks and fuel supply, and tested out the mechanism of the craft which he found to be working perfectly. He called an attendant, and together they wheeled the craft out upon the roof level which was bathed in the warm sunshine of a June morning. The young astronaut entered the space flyer, closed the door, and was alone in the air-tight compartment just large enough to accommodate him. On the instrument board before him were dials, levers, gauges, buttons and queer apparatus which controlled and operated the various features of the craft. He turned on his oxygen supply and his air rejuvenator so that the air could be used more than once, after which he shoved his starting lever forward. The craft raced suddenly off the roof and into the cloudless sky above the vast city of the twenty-sixth century.

Up and up he arose, until those upon the roof lost sight of his flyer as it disappeared, a minute speck against the deep blue of the sky. Below him, the city could be seen as an indistinct, white blur upon a background of green. Farther and farther he rose until he was in the rarefied atmosphere of the upper air currents. It grew intensely cold, and the young astronaut found it necessary to turn on the heating system. He now increased his speed from an even 300 miles an hour gradually to 1,000 miles an hour 'until he should find himself beyond the friction of the Earth's atmosphere. At this speed, it was but a short time before the tiny space flyer found itself in the vacuum of outer space The little craft had six windows of a thick glass-like substance which was colored a deep transparent brown to nullify the blinding glare of the sun. The windows pointed in six different directions, and it was from these that Jan noticed the daylight ebbing, to be replaced by the utter blackness of night, except where the blazing ball of the sun shone through the brown glass windows. Through one window, he could see the curved contour of the Earth which he was so rapidly leaving, while from each of the other five windows the dazzling brilliance of the clustered stars shone with an iridescent gleam never seen upon Earth.

Jan did not notice the beauties and wonders of outer space, for he had seen them many times before, and so he watched his instrument board, increasing his speed until he hurtled through space in the direction of Mars at the rate of two thousand miles per second, eating up the distance at more than seven million miles per hour. While he was in the vicinity of the Earth, a steady stream of small meteorites beat a tattoo upon the space ship, but as he left the Earth farther behind, the meteorites with which he came in contact were few. Many of them were large, and traveling at the rate of ten to twenty miles per second could have damaged his flyer. But an instrument recorded the approach of the large ones, and when one came within a distance of ten thousand miles, a small bell inside the craft started ringing, while a small arrow in a glass case pointed out its direction.

The young astronaut sped on through the ether void for the equivalent of an Earth day. Through space it was eternal night, with a sun shining from out of the blackness. Immeasurable distances off in all directions were millions of suns and worlds. On ahead of him Mars was growing from a dull red point of fire to a rose-colored sphere, appearing as large as the moon does from the Earth. The rotating sphere grew larger, in proportion to the speed of his approach, its two twinkling satellites becoming visible, one just below, and the other to one side, of the planet. Behind him, he saw the Earth as a large, green star of the first magnitude, and on looking sharper, he saw an accompanying point of light beside it.

Jan would have liked very much to have landed on Mars so that he could have stretched his limbs, but he dared not, for the chronometer at his side told him that if he were to intercept the meteor train the other side of Mars, he would need all of his time. He rapidly neared the red planet which now appeared as a huge ball, filling all three of the nearest windows. Jan made a circuit around the planet, passing by the darkened half which lay sleeping under the repose of a Martian night, and continued on towards Jupiter. He sighted the South Pole on Mars, and kept his ship some two hundred thousand miles above it on a direct line towards the great planet Jupiter. He watched a dial which recorded the approach of giant meteors within a distance of a hundred thousand miles, for soon he expected the group of cosmic wanderers to come sweeping along on their aimless journey. If he missed them, it would be necessary to land on Mars and get new bearings at the observatory before he continued the chase, but he disliked doing this for it would take more time and be a reflection upon his efficiency. And Jan was working for a promotion to the passenger limited between Venus and Mars.

The Meteor Train

THE bell tinkled! He looked at the dial and saw that the needle pointed straight ahead of him upon the course he was pursuing. The company of meteors were rushing toward him head on. He turned his flyer on a slant, and slackened his speed continuously for hours until finally it was down to twenty miles per second. He was rushing off at an acute angle so that he would avoid a possible collision. He watched the needle and saw that the train of meteors would soon be opposite him. He was careful to place himself on the sunward side of their approach, for had he been on the opposite side, they would have passed within a few feet of his flyer and he would have been unaware of it, except that his dials would have announced their proximity. He now watched the dial which recorded

the smaller number of miles, and saw that the meteors were a thousand miles distant. Turning his flyer back in the direction from which he had come, he ran parallel to the course the celestial bodies would pursue, slackening his speed down to ten miles per second. The distance, as his dial informed him, was rapidly being decreased by the oncoming meteor train. It was now within five hundred miles of him, uncomfortably close, considering the fact that he was not entirely certain of its speed. The astronaut was traveling ten miles per second in the same direction as the meteors' course, and the cluster comprising the meteor train was bearing down upon him, so he figured that it must be traveling at approximately fifteen miles per second. He tested it by speeding up his space flyer to the same rate; it gained on him slightly. The young astronaut decided to allow it to pass him, and then come up from behind; so continuing at fifteen miles per second, he awaited its passing, five miles from its course.

He saw it only as a sudden indistinct flicker, for it passed at a speed greater by three thousand miles per hour than his own. Increasing his speed, he began to creep up behind the meteor cluster, preparing for his hazardous work of running alongside one of the meteors at the same exact speed, and hooking on with his grapples. It required nerve, precision and dexterity, and many an astronaut had met his death trying to ride a meteor in the seas of space.

He soon came within sight of the cosmic wanderers and whisked by them. It was hard work attuning his speed exactly to that of the meteor group, and as he slackened his speed, the meteors flashed past him once more, reflecting the sunlight which struck them. It was the delicate control of the little space craft which finally enabled the astronaut to ride even with the meteor train only a hundred yards away. From this distance he surveyed it. The head was composed of three huge meteors better than two hundred feet thick with rough, jagged sides, resembling miniature mountains careening through space. In the wake of the first three, came smaller ones with fragments intermingled with dust.

The young astronaut singled out the nearest of the large meteors and sent his space ship in on a narrow slant which would gradually converge with the course of the meteor, bringing the two together. One hand was ready on the switch operating the grapples, while his other hand rested on the steering controls. All immediate danger would be over when he grappled on to the celestial body, but it was perilous work, requiring experience, skill and steady nerves in order to close successfully upon the giant meteor.

The sun beat its blinding light upon the rugged, uneven side of the huge meteor, throwing into sharp relief every detail. The sunlit portions lay scattered over its face, relieved by numerous shadows due to the fact that the irregular surface did not allow the sunlight to strike all of the meteor's side which faced the sun. These shadows, because the great rock lacked a surrounding atmosphere, lay etched in bold relief, so that the sunlit side of the meteor presented a series of shadows and illuminated crags to the young astronaut.

Probably the remains of an old comet, thought Jan, gazing thoughtfully at the meteor he was nearing slowly but surely. It was odd how queer it was shaped, bulging at the top, and narrowing at the bottom. Somehow, it was an unpleasant reminder of something he had seen but could not place at the moment. He was within a hundred feet of the great piece of rock, and gradually the distance narrowed as they raced along through space together at the rate of sixteen miles a second.

Suddenly, an uncomfortable discovery forced itself upon the mind of the young astronaut. As he neared the meteor, he recognized what it resembled, and why it had stirred his memory so strangely. From a short distance away, it bore the perfect likeness of a death's head! There was the white, bulging forehead, the sloping jaws, and two huge, round shadows, with a third midway below it, for the sunken eyeholes and the nose. Most horrible of all was the mouth, bearing the fixed grin of death! The death's head glared at him malevolently, as if issuing an ominous warning!

Jan Trenton was not superstitious. Superstition had died out completely from the Earth hundreds of years ago. But the abruptness of the discovery, and its gruesome appearance startled the young astronaut and, for the first time in his career as a lone space flyer, he felt himself weighed down with an overwhelming sense of loneliness. Out in this vast depth of endless space he was millions of miles from friends and all manifestations of life with this grinning effigy, one of the freakish coincidences of the Universe, as a solitary companion. From whence had this meteor come? Probably from the region of the asteroids adjacent to Jupiter, possibly from outside the solar system, from some other system of worlds, having traveled to this destiny perhaps for the last billion years or more.

He had half a mind to swerve off from his prospective landing on the huge meteor, and couple on to one of the other two, but he laughed at himself and his unreasonable timidity. He dispelled by ridiculing himself the morbid imaginings, which had been stimulated through sight of the death's head. He prepared to go through with his original plans, despite the fact that the task was strangely distasteful.

The young astronaut was now very close, so close that the meteor towered above the little space ship. Jan stood ready at the grapple controls, waiting for the supreme moment of contact. It came with a terrific jar which threw him out of his seat against the side of the flyer, bruising him severely, just as he shoved over the grappling controls. He must have made a slight mistake in his calculations of angles, thought Jan, for he had not been prepared for the shock of the contact which greeted him. The grapples had taken hold, anyway, and he was safe for the present, at least. He feared, however, that part of his outside apparatus had been damaged in the contact, but if there was enough of it left with which to work on the meteor, he did not care, for he could have it repaired when he got back to Earth, or he might even stop at one of the Martian stations, for that matter.

Caught!

He tested the grapple controls, the rock drills and the iron fingers, finding that over half the number on the flyer next the meteor were either broken or jammed out of shape. With the remaining exterior apparatus, he took samples of the meteor's substance, drilling out small chunks and depositing them into the receptacles along the side. The next procedure was to ascertain whether or not the meteor contained valuable metals, unknown substances or precious stones.

Before him, at the top of his instrument board were three dials ranged in a row. The central dial was a huge affair, while its two companions, one on each side, were a great deal smaller. Each of the two small dials was equipped with a small manipulator which moved

the needle around the face. The dial on the left represented the means by which the young astronaut discovered whether or not a meteor held diamonds, sapphires or other valuable stones. At various intervals around the face of the dial, the names of all precious stones known to science were marked off. By slowly moving the arrow around the dial, and pointing to the name of each individual jewel, it was possible to find out the presence of one or more of the stones. Above the dial was a small light which flashed on whenever the arrow pointed at a type of stone which was present in the meteor's mass.

The small dial on the extreme right operated on the same principle except that it was for finding various metals. Around the rim of the large dial in the middle, was listed all of the elements composing the Universe. Opposite the name of each element was a small indicator which swung away from it, pointing towards the center of the dial; outside, rested a series of small buttons, each button communicating with one of the elements listed within the dial. A button depressed would cause the tiny indicator to swing out of neutral and point to the element, providing that element was present in the meteor's composition. In this manner, a great many combinations not listed on the two smaller dials could be formed to ascertain their possible existence within the meteor.

Jan tested the meteor for the various stones. It was entirely devoid of gems. Had he discovered a supply within the wanderer of space, the astronaut would have drilled them out, providing they were near the surface, for the little space flyer was equipped with the facility for pointing out the definite location of the stones as well as recording their proximity. In case of their being too deep for the surface drills, he would chart the course of the meteor, and if the deposit of jewels or metals proved valuable enough, a wrecking crew would be sent out a few days later to overtake the meteor and extract its treasures.

He now turned his attention to the right hand dial, his hand upon the manipulator which sent the arrow around the face in short, periodic jerks. As he expected, the light above the dial flashed on when the arrow pointed to "iron." He found that the bulky mass also contained nickel, and a small amount of platinum whose scarcity did not warrant the trouble of its extraction. The central dial proved the fact that the meteor's main constituents consisted of iron and aside from the nickel and platinum deposits was entirely devoid of all other minerals.

Having finished with the death's head meteor, Jan decided to cast loose and explore the other two celestial wanderers which comprised the meteor train. The astronaut loosened the grapples, and threw in his controls which would send him away from the meteor. To his surprise, the space flyer refused to move. He turned on more power, and still his flyer did not budge, though he knew that his atomic energy machine was functioning perfectly, for his instrument board told him that. Evidently the force of his contact with the meteor had been so great that the little space car had become wedged in the side of the meteor, or else the twisted parts of the broken grapples and the other exterior apparatus which had been damaged in the collision, had become jammed into the meteor when the two came together. It was certain that he was stuck fast, and that he must search for some means which would effect his release from the predicament in which he found himself. He wished now that he had heeded the grave premonitions the sight of the gruesome meteor had awakened in his mind, and avoided contact with it. But then, it was likely to happen to any space flyer engaged in the same hazardous pursuit as his.

He worked vainly at the controls of the damaged grapples and the jointed, exterior appliances, but the attempt was useless for they remained as immovable as if cast in a mold of steel. He was a prisoner, a prey to the death's head meteor which carried him farther away with it every moment, traveling at sixteen miles a second. They would soon pass by Mars, continue upon a route midway between the Earth and that planet, and eventually on out of the solar system towards the distant stars. What would be his fate? Would he starve, or his oxygen supply give out? Jan did not for a moment contemplate such thoughts. The Meteorological Bureau, seeing that he did not return within a reasonable time, would radio Mars, and the observatories of both worlds would train their giant telescopes upon the meteor train and discover his plight. No doubt, they were watching him now, the largest telescopes revealing his space ship as a small bright speck upon one of the three larger spots. It would be only a question of time, then, before help would be sent him, and his release obtained.

His thoughts were suddenly interrupted by a crashing jolt which once more threw him out of his seat at the instrument board just as it had done when his car had landed upon the meteor. What had happened? The meteor must have struck something, and it could be nothing more than one of its two companions, for there was nothing else in this vast void for it to strike. It might have been another flock of meteors, and had it been so, his instrument board would have announced their approach long before this.

Jan's logical reasoning, and his cool headedness in the face of the alarming situation, led him to the following solution. When his space car had landed upon the meteor, the force of the contact had been great enough to push the celestial wanderer off its course slightly, and all of the time it had slowly but surely converged its plane of direction with that of its nearer companion, so that they had come together at an acute angle, producing the shock he had just felt.

If this was so, thought the young astronaut, then the course of the meteor upon which his space ship was imprisoned must have veered again, following the second contact, slightly changing its course once more. He examined his instrument board and peered out of the brown glass window into the black, cosmic void. The sight which greeted his eyes appalled him with its terrifying significance fraught with sinister menace! Below him was the planet Mars, and the meteor on its changed course was rushing at it full speed! The red planet appeared as a half circle of light, new contours appearing upon its face from out of the darkened half.

The face of the young astronaut was drawn into tense lines, as he turned about towards his instrument board to find that the distance between himself and the planet Mars was a little better than a hundred thousand miles. He rapidly figured that unless he could release the space flyer from the giant meteor, he had but two hours in which to live! The death's head meteor, which was originally charted to pass by the planet Mars was now, through two slight collisions with the space flyer and the other meteor, plunging head on towards Mars! Jan visualized his end. The wanderer of space with its prisoner, traveling sixteen miles a second, would hurl itself into the Martian atmosphere which, though thinner than that of the Earth, would offer a great enough friction to create out of the meteor a blazing

ball of fire, screaming through the air like a juggernaut to bury itself beneath the surface of Mars with a terrible detonation!

A Desperate Hope

WHILE the meteor was miles above Mars in the upper reaches of the rarefied atmosphere, the young astronaut would die of the intense heat from the friction of the air. Under the terrific heat, the space flyer would explode and burn up to a cinder within the space of a fleet second, to leave the death's head meteor mass continuing on its wild flight to destruction!

Jan Trenton quickly snapped himself out of the channel of gloomy, terrorizing thoughts which assailed his mind, holding it paralyzed for a brief moment. He had nearly two hours by Earth time before the meteor reached Mars, and he would die like a man, fighting for his life to the very last minute. He gazed out of the window on the side towards the meteor to note his position, and find out in what manner he was caught. A chill crept over him at the irony of fate! The little space car was jammed up against that dark rift of shadow which was likened to the mouth of the death's head! From a short distance, it would appear as if the grinning skull held the space flyer in its teeth, carrying it rapidly to oblivion!

If he could only have torn the imprisoned grapples free. But this was impossible in view of the fact that they were on the outside where he could not gain access to them. He released his atomic energy in all directions, trying to work his way loose, but the flyer was as immovable as a part of the meteor itself. He placed a terrific power behind him, capable of sending him racing through space at top speed had he been free. It was well that the staunch little craft had no weak spot or it would have torn itself to pieces. But the space car was strongly made and the effect of its great, atomic energy release was not to free the space ship or divert the course of the meteor, but to cause a surprising result. The meteor began to rotate on its axis, slowly turning in the direction opposite to that of the power release.

The planet Mars flashed past the window at short intervals, its semi-circle of light glowing a dull red. As Jan peered from the window during several complete rotations of the big meteor, he saw that the rest of the meteor train had vanished, no doubt pursuing their original, aimless course past Mars.

The young astronaut had one last plan, and he lost no time in proceeding to put it into operation. He would attempt to drill his way out with the exterior drills on the little craft towards the side which was held by the meteor. It was a question whether or not the drills could free him before the meteor crashed into Mars. He reached quickly for the controls which operated the drills to find that there were only three drills on that side of the flyer towards the meteor which had not been damaged. The others had either been broken off or else lay twisted amid the wreckage of the exterior apparatus which imbedded itself in the meteor. Jan set them going, directing their sharp ends into the rock around the point at which the little space craft clung to the meteor. Tiny showers of dust rattled against the sides of the flyer as the drills bit into the huge meteor rotating slowly, as it ate up the distance to the great world upon which it was destined to crash.

The young astronaut watched the three drills work, operating them from inside the flyer, while at frequent intervals he would steal glances at his chronometer, and then at the Martian planet which was gradually filling his field of vision. A feeling of sickly despair tugged at his heart, and hope grew dim as he saw that he had less than three quarters of an hour left. He had drilled a series of holes in the meteor all the way around the imprisoned grapples, at a distance of several inches apart. With the steel fingers on the jointed rods outside his car, he had torn away what rock had been loosened, and still the flyer clung to the face of the whirling meteor rushing towards Mars at a frightful speed, diminishing the distance at nearly a thousand miles a minute.

Still he worked doggedly at his controls, and a cold sweat broke out upon him as he watched the minute hand crawl slowly around the chronometer. Glancing at his three drills, he saw that one of them needed changing, and proceeded to place it in a new position. His spirits were at low ebb, but as long as life existed in his body, the young astronaut would continue the attempt to free his imprisoned flyer, and extricate himself. Jan felt that in his perilous calling he had cheated death too long, and that this time the grim reaper held the winning cards. The hands on the chronometer had now stolen to a position which indicated that less than fifteen minutes were left him. The vibration of the drills could still be felt within the space flyer, and a steady swish of meteoric debris against the side of the craft made itself heard.

Jan gazed dully out of the window away from the meteor whose rotation gave him a round-trip view of the entire sky. He was now so close to Mars that he could clearly discern some of the mountain ranges and flat, red deserts as the planet swung past his eyes. He gazed longingly at the brilliant green star, his home, which turned upon its orbit far off in space. He had left it for the last time. The scintillating stars gleamed brilliantly in the blackness and from the incandescent mass of the sun leaped great columns of flame. Once more the meteor had completed its day of little more than a minute, and the certainty of doom grew more ominous.

As the last minute crept around on the chronometer, Jan Trenton prepared for his end. Setting the three drills working at their maximum speed, he turned on the entire power of the craft as it sailed down into the Martian atmosphere with the meteor on its terrific flight. A glare of light flitted quickly through the windows, and a weird whistling arose to a wailing scream. Just before he lost consciousness, the young astronaut was aware of a great wave of heat which swept over him like a blast from a furnace.

The meteor struck upon the darkened side of Mars at an hour closely preceding dawn. Martians who saw it, afterward described it as a great ball of fire which rushed out of the sky like a comet, setting the heavens aglow with its glare. While still high in the air, it exploded with a loud concussion which was heard for hundreds of miles, the masses of scattered fragments catapulting themselves into the quivering ground, throwing up a cascade of dirt and rocks, flattening trees, and leaving great craters. It appeared to burst into two large central nuclei with smaller pieces surrounding them. Those near its landing place reported a tremendous wave of suffocating heat which swept the vicinity when the meteor landed.

Deliverance

AS Jan came to himself, his first sensation was a dizzy feeling in his head, and the oppressive warmth within the space flyer. He gathered his scattered wits together. Hadn't the crash come yet? It

(*Continued on page* 650)

The Thunderer

By A. H. Johnson

(Illustration by Paul)

I dropped my whole load of bombs and side-slipped desperately to get out of the path of the explosion I knew was coming. It came with an ear-breaking concussion; the plane swayed and pitched.

A. H. JOHNSON

FAR below and to the northwest shone the lights of New York City. Above were the stars of a summer night. To the east and south, and below, rolled the waters of the Atlantic. The only sounds I could hear were the smooth hum of my Hispano-Suiza "Special" motor, the whir of my propeller, and the whistle of the air in the struts, as my plane cut the air at 270 miles an hour. I was on a practice flight testing a new type of plane, with which the United States intended to regain the Schneider Cup.

The beauty of the sky, and the glow of the lights of the great city, induced my thoughts to take a contemplative turn. Here I was, a captain, and a not-altogether-unknown captain, in the air service of the greatest nation on earth. My ship was a combat plane built for fighting, but I was likely to see no fighting. The United States was at peace and likely to remain so; for there was no nation powerful enough to attack us. New York, called by certain foreign nations "the bomber's paradise" because it contains more wealth in a smaller area than any other city on earth, was safe. Instead of being used in war, my ship would be used only in the contests of peace. Well, so be it. There was enough danger in the Schneider Cup races to satisfy anyone, except, possibly, the graduates of a "fly-by-mail" course.

So ran my thoughts as I sped through the air. Then I became aware of a gradually-increasing hum far to the east. At first I thought it another plane; but the hum was higher in pitch and much louder than that from a plane, coming to me from that distance. It reminded me most of an enormous bumble-bee.

The sound gradually drew further away; and it had practically died out when, far to the east, I saw what I took to be a great flash of lightning. A minute or two later I heard the sullen roar of thunder. The lightning flashed again and seemed to break into an almost steady discharge. I searched the sky for clouds, but there were none. The thought crossed my mind that it might be a terrific thunderstorm whose lightning was visible while the clouds that caused it were still unseen. The roar of the thunder became continuous and my plane began to rock in vicious gusts of wind. Far below me quite a sea was getting up. I increased the speed of the plane to 300 miles an hour and this steadied it somewhat.

The peculiar features of the storm aroused my curiosity and, for a few minutes, I turned my plane toward it. But the wind was so strong and so gusty that I soon turned and headed for Langley Field. I had not gone far before I began to have doubts about reaching either that or any other earthly haven.

IF we knew more about the atmosphere surrounding our earth, the science of aerial navigation would be much further advanced than it is to-day.

Few people realize that we are living at the bottom of a fluid ocean which we call air, and that this fluid's actions are so complex as to be almost unpredictable. Create a tremendous atmospheric disturbance at one point, and immediately a large area becomes affected in peculiar ways.

This is brought out most convincingly in the present story, which is based upon good science and shows how we can be placed at the mercy of the elements by a clever scientist. Not only that; but, if he is selfish he can deprive us of some of the vital necessities of life. We are glad to introduce Mr. Johnson as an aviation-science-fiction writer of the first rank.

The wind blew in terrific blasts and, to my dismay, it came from almost any point of the compass. The roll of the thunder was incessant and the flash of the lightning had become almost a steady glow on the horizon. Yet no clouds were visible, nor did I see any that night.

The plane rolled, pitched, dropped, and rose; and, since it was a racing craft, and lacked the sturdy construction of a "stunt" plane, I began to expect any moment to have a wing broken off by the cross winds. I pulled the throttle wide open until we roared through the night at some 450 miles an hour; and began climbing in an attempt to get above the storm. An enormous sea was running. Soon the coast of New Jersey was below me. The storm center seemed to be directly behind me; so I headed straight inland.

The violence of the wind had decreased considerably and I glanced at my compass to get my bearings. To my surprise the compass showed that I was moving due north; though I had thought myself headed south of west! Looking at the heavens, I saw with consternation the north star in the east. I again looked at the compass, and was astounded to see it spin around on its axis once or twice and then point in exactly the opposite direction from that in which it had been pointing! Clearly the instrument was not to be relied on. At the same time my motor began to miss, and a minute later gave a final cough and stopped. I tried desperately to start it again.

There was nothing to do except to make a night landing in unknown country. I dropped a flare, which showed an open field about two miles away, and began a spiral glide. Although, from my altitude, I could make it without trouble, I recognized that landing on an unknown field is always dangerous. So, while still a few hundred feet in the air, I dropped another flare and, to my horror, saw that the field was full of stumps. But I had to continue down and landed at some sixty miles an hour (all racing planes have high landing speeds) and congratulated myself on avoiding the stumps. But, just after my ship had lost most of its speed, I struck squarely on one. When I finally examined the plane, I saw that the landing gear was so damaged that it was impossible to take off again without repairs.

What the Papers Reported

I SOON found a road and, getting a ride with a passing motorist, reached a small town. I was in northern New Jersey and, as it was now almost one o'clock, I decided to spend what remained of the night there and take an early train to New York in the morning. The plane could not be moved without a wrecking crew, and I could return for it in a day or two.

In the morning, before I boarded the train, I purchased a New York paper to get the account of the queer storm last night.

In black bold headlines I read:

BIG STORM OFF NEW YORK COAST!

Large Death Toll Feared—Damage Runs Into Millions

A terrific electrical and wind storm, evidently centered some 75 miles east of New York harbor, broke last night at 10:00 p. m. It was accompanied by what the Weather Bureau describes as the most boisterous seas ever reported. Much shipping is thought to be lost. The waves that broke over New York harbor have done millions of dollars damage to shipping, docks and wharves. It is reported by observers that the level of the water in the harbor sank several inches, and that there was a very strong outgoing tide at 10:10 last night, though at that hour the tide should have been coming in. At 10:35 the water returned into the harbor with the force of a tidal wave, rising over thirty feet in the Narrows. There have been few detailed reports of casualties yet; but it is certain that there has been considerable loss of life. . . .

The storm was accompanied by a severe electrical disturbance. Telegraph and telephone wires within a radius of some hundred miles around New York City were put out of commission for hours.

Then it was my vanity that made me overlook the other large headlines on the same side of the page and to hunt for and find a small note in the lower corner of the paper:

WRIGHT CUP WINNER REPORTED SAFE

Captain David Anderson Makes Forced Landing in Northern New Jersey

It was at first feared that Capt. David Anderson, the army flier who won the Wright Cup in 1950, was lost in last night's severe storm; but he wired from New Jersey that both he and his plane, *The Sparrow Hawk*, are safe. Capt. Anderson was making a trial flight off the coast at just about the time the storm struck. . . .

CHAPTER II

The Thunderer

FROM this small note I glanced back at the headlines I had missed:

CRANK CLAIMS RESPONSIBILITY FOR STORM

Writes Letter to Heads of Governments Demanding Supreme Power—Threatens Recurrence of Last Night's Storm if Demands Are Not Met

(By A. P.)—Government officials at Washington last night received the following letter, which it is understood has been sent also to the heads of every important nation in the world:

To the Governments of the World:

Last night the world was treated to a display of my power. I created the storm that ravaged New York's coast. The world will readily recognize what devastation I can cause by the full exercise of my power. In order to purchase my good will, the world will do the following:

1. Pay me the sum of one billion dollars to be placed at my disposal according to directions to be given later.
2. The services of three hundred men, scientists and technical experts, whom I shall name, shall be placed at my disposal.
3. A territory of one hundred square miles in some temperate climate shall be set off as my absolute kingdom. I am to be supplied with guards and laborers in such numbers and at such times as I may demand them. No one except the persons I designate shall enter this territory.
4. I shall have absolute control of all marriages and the right to sterilize any person or group of persons at any time.

My rule will be of incalculable benefit to the world generally. The human race is now threatened by a number of dangers which the governments of the world will not and cannot prevent. The greatest of these dangers is the multiplication of the unfit. In the natural state the unfit of any species, whether animal or man, are killed off by enemies before they are allowed to breed. Thus the species in a natural state tends to become more and more perfect, since only the best individuals survive. But, in a sentimentalized civilization such as ours, the conditions are reversed. The unfit breed more quickly and those who should be sterilized are allowed to propagate. Thus the numbers of unfit tend to perpetually increase. To give the figures for the United States, the numbers of the insane are increasing at the rate of half of one per cent. per annum; those with defective eyesight at the rate of three-quarters of one per cent. per annum; the number of persons with defective hearing at the rate of one-quarter of one per cent.; the number of feeble-minded persons at the rate of one per cent. The teeth of civilized men are, already, about ninety-five per cent. defective. If these conditions are not changed, the man of a few hundred years in the future will very probably be feeble-minded and partially insane and, in addition, will certainly have defective hearing, eyesight, and teeth. In all probability he will be excessively susceptible to all kinds of disease.

These facts are too well known to admit of argument. I have waited patiently for the world to manage its affairs reasonably. It has not done so. I intend therefore to manage the world as an intelligent business man manages a corporation, or as a stock farmer manages his stock. I know that there will be resistance and objection to my rule. The various governments of the earth are largely controlled by the mass of their citizens who are intolerably stupid. They will resist my rule, but I intend to crush all resistance.

If the governments of the world will accede to my demands let each, on the twentieth day after receiving this letter, raise a white flag on its capitol building. Failure to fly this flag will be a signal for adequate punishment.

THE THUNDERER.

In addition to these articles the paper contained on the front page an interview with a high state official at Washington who pooh-poohed the idea that the

author of the letter could be, in any way, the cause of the storm. A hastily-written editorial in the paper echoed the same sentiments and hoped that no notice would be taken of the letter at Washington except to have the author found and placed in a lunatic asylum.

I rather agreed with the official, especially with regard to the insanity of the sender of the letters. But one thought kept recurring persistently to my mind. The letters were sent before the storm occurred; yet they referred to it. If there were no connection between them, how had the author known that the storm would occur? Then, too, the storm had been very peculiar; there were no clouds, and very unusual electric phenomena. What if the "Thunderer" were not bluffing? What if he had really caused the storm?

When I reached Air Corps headquarters in New York, my head was in a whirl from these speculations.

I made my report, giving a complete description of the storm and my experiences, and turned in to make up for some of the sleep I had lost the night before. When I awoke, I found waiting orders to appear before the commandant.

With the latter were three other men: one, an intelligent and kindly-looking man of about 55 or 60, I already knew as one of the official staff of the President. Another, I was surprised to hear introduced as Dr. Arnold Wilkinson, the great scientist, who had earned a world-wide reputation by his discoveries in physics and chemistry. The third, and the youngest of the three, was in some respects the most impressive; his face had a hawk-like nose beneath deep-set, piercing eyes. He was introduced as Mr. Robert Canning, head of the U. S. Intelligence Department.

Colonel Johnson explained the purpose of the meeting at once.

"Captain Anderson," he said, "these gentlemen desire to question you about the storm which you observed last night. It has become apparent that the storm may have been an event of much greater importance than was at first realized. Mr. Forbes and Mr. Canning have come from Washington, and Dr. Wilkinson has been called from Chicago, to investigate the matter."

Mr. Forbes cleared his throat:

"To be frank with you, Captain," he said, "the government is much more concerned with last night's disturbance than we have officially admitted. We have read your report with great interest, and we have received several other reports from vessels near the storm center that corroborate your observations. Dr. Wilkinson and a number of weather experts and scientists have also studied these reports, and they agree almost unanimously that, if the reports are correct (and we have no reason to doubt them), last night's storm is unprecedented in the history of weather disturbances."

A Serious Conference

DR. WILKINSON broke in here: "I will go even further than that," he said. "If the reports are correct, then last night's storm was no natural weather phenomenon at all, but was artificially induced. The total absence of clouds, the severe electrical disturbance, the records of the coast weather stations, which show a strong current toward the storm center from all sides, and several other factors, show that, without a doubt, it was no natural occurrence!"

"Just so," broke in Mr. Forbes, "and, if your opinion and that of the other scientists is correct, Dr. Wilkinson, that the storm last night was not a natural phenomenon, then the man or men who wrote the letters sent to all the governments of the world, do, more or less, understand and control it.

"If this be the case, it is clear that after the letters are ignored by the various governments (as I am sure our government will ignore them) then, as soon as the twenty days allowed are up, we may expect a repetition, and probably a much more destructive repetition, of last night's storm.

"In the next twenty days, therefore, we must either discover and arrest the author of the letters or, at least, we must discover enough about the means by which he produces his effects to protect the world."

Mr. Canning spoke next: "I regret to say," he said, "that our chances of apprehending the sender of the letters seem to be almost nil. We traced the letter sent to our government to the place where it was posted, a sub-postoffice in New York City; but there the trail ends. The foreign governments have not yet taken the situation seriously; but, even if they do, I am sure that the difficulties are too great to trace the 'Thunderer' by these means. The knowledge that he must have, if he really caused the storm, would make him a world-famous scientist; and my department is now checking over the list of all the possibilities. I think, however, that the 'Thunderer' is far too clever to be caught by any such simple means. His letter shows that he is carrying out a well-considered plan and is acting on no mere impulse. In that case he has undoubtedly considered the fact that, the day after his letters were received, the whole world would be looking for him."

Mr. Forbes again spoke: "In that case, Captain, you see our chance depends on working out a defense to the attack which will probably come in twenty days. For this reason we ask you to repeat your report to us and give us any further details, which may have occurred to you in regard to the storm."

I again recounted the occurrences of the previous night, mentioning in particular the curious buzzing I had heard prior to the storm.

Dr. Wilkinson inquired about this, and remarked that the accounts of the storm that he had from other sources also mentioned it.

"Captain," he asked, "have you any theory that might explain that buzzing sound? You say that it was not the sound of an airplane propeller? Was it, possibly, the hum of a high-speed motor?

"No," I replied. "I have heard the whir of a propeller and the hum of a motor far too frequently, ever to mistake them. If it were a propeller that caused that sound, it was moving three times as fast as any propeller known to-day; for the sound was much higher in pitch."

"Well, gentlemen, said Mr. Forbes, "have any of you any explanations to advance, or any theories to offer?"

When no one answered he continued: "As for myself, I must admit at once that I am completely puzzled. The only thing to do, as I see it, is to adjourn until some later time. We may then have further information to go on. Captain Anderson, I am going to ask you to become a member of our committee. Your colonel will give you leave of absence until this affair is settled.

"But, before we adjourn, I am going to ask you all to consider the facts we have before us, and attempt to work out some rough explanation or theory as to the storm of last night. Until we have such a theory as a working basis, we cannot possibly devise means of defense. And I am going to suggest, further, that you do not reject any theory that may occur to you because of its apparent impossibility. Last night's phenomenon was both unusual and apparently impossible, and any

explanation of it is very likely to partake of the same qualities."

Confused Thoughts

AFTER a few more words the meeting broke up. As soon as I reached my new quarters I leaned back in a comfortable chair and lit a cigarette to think over the amazing events of the last twenty-four hours. I had been very much surprised to be made a part of the investigating committee and I was also pleased and proud, as a mere captain, to be associated with such companions! I smiled with pleasure, but almost immediately afterward frowned; for I remembered that the reason for this association was that the government believed itself to be in grave danger. In order to prove myself worthy, I must assist toward a solution

Then I remembered the words of the "Thunderer." Would it really be worse for the world to be under the control of such a man, providing he were all that his letters claimed, than to be ruled by its present inept governments? I am well enough educated, in a general way, to know that most of his statements as to the increase of insanity, etc., were correct. In a moment I banished these thoughts. No matter how intelligent this man might be, he was, most apparently, morally deficient. He based his claims not on any moral principles but on his boasted power to enforce them. He would rule the world as a stock breeder manages his stock; he would reform us willy-nilly, whether we wished it or not. A great anger came over me to think that any man should speak with such arrogance and contempt for the rights of others. I determined that, from now on my efforts would be directed solely to catching this self-styled dictator and delivering him up to justice. If he had caused last night's storm, he was undoubtedly guilty of manslaughter or murder; for several persons had been drowned.

The next morning's papers carried no new facts about the storm, and very little notice was taken of the notes to the various governments except in a humorous way.

I spent the first few hours of the morning attempting to construct a provisional explanation of the storm—on the assumption that it had been caused by human agency. At the end of three hours I had made absolutely no progress. My thoughts continually circled around the fact that, for several years, man has attempted vainly to find some means of controlling the weather. Firing cannon at clouds to produce rain, for instance, has been tried, and has proved an utter failure. But then that could have no connection with this storm, for there had been no rain and probably not even any clouds. The one clue was the severe electrical disturbance, evidenced by the lightning. But how could there be lightning without clouds? And, then, what was the buzzing sound that I had heard? Was it connected with the storm? And if so, how?

My thoughts became more and more muddled. Rainmakers are said to use a forked stick; no, the finders of hidden subterranean waters employ a forked stick. Here I gave it up. Anyway, it is not an aviator's business to devise theories to explain the weather; that is the duty of men like Dr. Wilkinson.

Wearied of the endless thoughts, I turned back to a book that I had started several days ago. It contained an interview of Thomas A. Edison with Allan L. Benson. I had always great respect for Edison's opinions; but in this interview, obtained in 1916, it seemed that he had been entirely wrong in his predictions as to the future of aircraft. Of course, with our thirty-five years additional experience, it is easy for us to look back with superiority at the gropings of the pioneers in aviation.

Benson had asked Edison what he thought about airplanes and Edison is reported to have answered by the following story: Ten years before, he had been sitting in front of his winter laboratory in Florida. Not a cloud was in the sky. The air, bathed in sunshine, was perfectly still. The smoke from a neighboring chimney went straight up for a thousand feet. Almost as high as the pillar of smoke, soared a buzzard. Minute after minute, as Edison watched, the bird lazily described great circles. Sometimes it would slide down through the air a hundred feet and then climb back again. But whether the bird circled, slid, or climbed, it never flapped a wing. Always its wings were like the hands of a clock at a quarter to three.

Edison marveled. With no wind blowing, no wings flapping, how did the bird keep aloft? What enabled it to climb after it had glided down? Again and again, he asked himself these questions, but the answers did not come. Nine years later, they did.

"I think I know what kept that bird in the air," Edison said to Benson. "It traveled on sound-waves, and the little pin-feathers on the insides of its wings made the waves."

What he meant was this; any agitation of the air makes it vibrate in waves. Agitate the air rapidly enough and the waves come to us in the form of sound; then they are called sound-waves.

"The air, when struck with sufficient speed," continued Edison, "is as rigid as steel. Touch a match to a stick of dynamite on a five-ton rock and nothing will happen—the dynamite will be exploded, but not rapidly enough to shatter the rock. But explode the dynamite with a fulminate-of-mercury cap and the explosion will come so quickly that the air cannot yield. The rock will be split, because it is less rigid than the air."

CHAPTER III

An Amazing Theory

"EDISON believes," continued Benson, "that the buzzard kept aloft by causing the pin-feathers on the insides of its wings to beat the air with tremendous rapidity. He believes the buzzard traveled on sound-waves; precisely as the bumblebee travels on sound-waves. The bumblebee derives its name from the fact that, in flying, it makes sound-waves.

"Edison has a high regard for the bumblebee as a flier. He says its wings are exceedingly small in proportion to the size and weight of its body. It flies so well only because it uses its wings so well; beats the air until the air becomes like metal stilts. Moreover, he believes we shall have to learn from the bumblebee before we are able to travel in the air very far, very fast, or very safely. He would apply the bumblebee principle to lifting the flying-machine, and the present propeller system to driving it ahead. In his opinion, flying-machines should be able to go straight up. Airplanes can go up only by first taking a running start. 'Suppose you had four million trained bumblebees,' he said, 'attached to wire wickerwork on which was seated a man. Can't you understand that, if the bumblebees were signaled to fly, they would lift the man? I believe mechanical bumblebees could be so attached to a flying-machine that they would lift it straight up. By mechanical bumblebees I mean inclined planes revolving upon perpendicular shafts at tremendous speeds. Once in

the air, ordinary propellers could be used to drive the machine ahead.'

"Edison believes that the present type of airplanes will soon be discarded, and that 'bumblebee fliers' will carry passengers at the rate of a hundred miles an hour or more."

As I read these predictions of the "grand old man of science" I idly wondered why airplanes such as he predicted had never been built. It was very clear that if the principle was sound it must be the application that was difficult. No motors had ever been produced that were capable of driving mechanical wings at the speed of a bumblebee and, even if the motor were produced, the "wings" would shake themselves to pieces with the vibration. But, if such a ship could be built what a plane it would be! Able to go straight up or down, and with almost limitless speed. It would be worth a thousand of our present-day planes. But it would still have one defect; that is, it could not move silently. Since it moved on sound waves its progress would always be audible.

At this point I remembered the buzzing I had heard on the night of the storm. It was just such a buzzing as one of Edison's imaginary bumblebee fliers would make. Here I jumped out of my chair in excitement. That *must* have been what I heard! If a man had caused the storm, that man must have had some vehicle or some boat which conveyed him to and from the storm center. And any ordinary boat or aircraft would have been destroyed in such a storm. But such a plane as Edison spoke of could outlive any storm.

If my idea were correct, and the "Thunderer" had used such a craft, then he would undoubtedly use it again in his next appearance. And we would have listening devices installed in all the large cities which would warn us of his coming! We would be prepared for him! I smiled as I visualised a fleet of combat planes lying in a cloud-bank, 10,000 feet above New York, waiting to pounce on the "Thunderer." This self-styled "hurler of thunderbolts" must have some ship, indeed, if we could not get him after being warned of his approach.

The investigating committee met that afternoon and, excited and eager as I was to burst forth with my explanation of the buzzing sound, I noticed that Dr. Wilkinson seemed to be similarly excited.

Forbes, as representative of the President, was chairman and opened the meeting by asking if any progress had been made in explaining the storm. Dr. Wilkinson spoke up at once.

"I have a theory," he said, "which seems to explain all the observed phenomena; but it is so wild and unusual that I would hesitate to express it if the nature of the phenomena themselves were not so wild and unusual. My theory, however, is supported by certain facts which I have discovered for myself.

"As you gentlemen will remember, two significant features of the storm were: first, the remarkable electrical display; and, second, the fact that a strong current flowed toward the storm center from apparently every side. Now what could have caused that current? As you will remember from the newspaper accounts, the tide should have been coming in but, instead, there was a strong outward flow. The wind could not have caused it; because the wind blew in irregular gusts from all directions and especially from the direction of the storm center. Gentlemen, *the only thing that could have caused that current was the removal of a large quantity of water from the ocean at the storm center.*"

A gasp followed from Forbes and myself, a combination of a snort and a laugh from Canning, who asked sarcastically: "Would you mind telling us how a quantity of water large enough to have such an effect could be removed? Possibly the mighty 'Thunderer' drank it up?"

"I was just going on to do so when you interrupted," retorted Wilkinson sharply. "As a matter of fact," he continued, "Mr. Canning's guess was closer than he knew. The 'Thunderer' didn't drink the water up, but certain agencies under his command did that.

The Committee Agrees

"IT has long been known to science that, under certain conditions, electricity has the power of decomposing water into its constituent parts. While water is pure the effect of electricity on it is almost negligible. But when certain other substances—sometimes called catalyzers, among which sulphuric acid is perhaps the best known—are present in the water, an electric current will decompose the water into its constituent parts of hydrogen and oxygen. This is a simple fact, well known to every elementary student of chemistry. However, the amount of electricity necessary to decompose any considerable quantity of water is so large that no commercial use has ever been made of this fact.

"I am convinced that the 'Thunderer' made use of this principle in causing the storm. The amount of water decomposed by an electric current depends on two factors. First, the strength of the current, and second, the amount of sulphuric acid or other catalyzing agent present in the water. I am convinced that the 'Thunderer' for whose chemical knowledge I have the highest respect, has discovered some catalyzer which is several hundred times more efficient in enabling electricity to decompose water than any now known; and, he has at his command quantities of electricity that equal the power of thunderbolts and probably exceed them.

"My explanation of the storm is about as follows: In some way which I do not understand, but probably in some boat or aircraft (possibly indicated by the humming sound heard by Capt. Anderson and others) the 'Thunderer' reached the storm center. Then he mixed his catalyzer with water and, in some manner, ran an enormous electric current through the water. The electricity decomposed the water and freed large quantities of hydrogen and oxygen. It was this increase of the hydrogen and oxygen in the air that caused the strong winds. And the water, rushing in to take the place of the decomposed water, caused the strong ocean currents and the high waves. The whole thing could be duplicated in the laboratory on a small scale.

"The puzzling features of it are the immense scale on which it was carried out, the nature of the catalyzer used, and the means to create electric currents of such magnitude. Frankly, I am utterly at a loss to explain these things; but I am convinced that my explanation is correct, for I have discovered proofs of it. In the first place an unusually large percentage of hydrogen and oxygen was noticed in the air immediately after the storm, and in the second place (which I regard as conclusive) I have analyzed some ocean water, taken from the sea shortly after the storm, and found in it a new substance which enables a small electric current to break down large quantities of water. So far this substance defies analysis but, in a few days, I hope to be able to determine its composition."

Remarkable as this explanation was, I believe that it carried conviction from the first, except to the mind of Canning. Wilkinson's name held such prestige in

the world of science that his mere opinion was accepted in preference to the settled convictions of other physicists; and, certainly, after I had followed the steps by which he arrived at his opinion. I had no doubts as to its correctness.

Mr. Forbes evidently held the same opinion for he said: "Dr. Wilkinson, in the past you have made your name known to all the leading scientists of the world; but, when your discoveries in connection with this affair are published, not only the scientists, but the humblest citizens of every country in the world will be familiar with your name.

"Gentlemen," he continued turning to Canning and myself, "Dr. Wilkinson's efforts have told something of the dangers by which we are threatened. It is up to us to form plans to meet them. However, before we attempt to plan a defense, let us see if we are so fortunate as to have any further information on our problem. Mr. Canning, have you anything to report?"

When Canning replied in the negative, he turned to me.

I explained my ideas in regard to the buzzing sound and read the part of Edison's interview which dealt with the bumblebee fliers. While I was speaking, there were several exclamations from my hearers and, as soon as I finished, Dr. Wilkinson replied:

"I am sure your explanation is correct, Captain," he said: "I am familiar with Edison's researches in aerodynamics and I have frequently desired to see an airship built according to his ideas. Moreover, since the only possible explanation of the storm requires some such vehicle for the 'Thunderer,' it is clear that your bumblebee flier *must* be a reality."

Mr. Forbes agreed and even Canning was at least half convinced.

Proceeding upon the assumption that the theories of Dr. Wilkinson and myself were correct, we attempted to forecast where the 'Thunderer' would strike next. Dr. Wilkinson thought that it would be off New York harbor again, and we were rather inclined to agree with him. It was decided, however, to have listening devices installed in all the large cities in the country and squadrons of combat planes held in readiness. I thought it possible that the "Thunderer" would strike at the series of lakes and streams that constitute New York's water supply; and it was decided that I should command a special squadron of planes for the purpose of protecting these vital points.

A Second Raid

WE were all busy during the next eighteen days. I was in charge of the disposition of the airplanes; Canning was attempting to locate a scientist capable of the "Thunderer's" achievements, and Dr. Wilkinson was installing the listening devices.

As the twentieth day arrived there was some revival of newspaper comment on the affair and some slight uneasiness among the people of New York.

I spent the day at a temporary camp in the Adirondacks which overlooked a beautiful blue lake, which formed a reservoir of New York City's water supply system. The *Sparrow Hawk* and three other planes were partially concealed under green boughs on a little plateau near by. The rest of my command were scattered throughout the area of the watershed. A telephone kept us in touch with a central office in Washington where Wilkinson, Canning and Forbes had installed a staff for all communications regarding the "Thunderer."

"Old Glory" had been raised over the capital at sunrise and was kept flying until sunset. There was no sign of a white flag.

We all expected immediate action on the part of the "Thunderer" and we were not to be disappointed.

At ten o'clock Wilkinson's voice, tense with excitement, announced that the detectors along the Atlantic Coast, from New Jersey to Rhode Island, had picked up a high-pitched humming which came from the east. Five minutes later, he announced that the sound was approaching New York at a rate of more than five hundred miles an hour. The air squadrons protecting the city had taken off, in an effort to get above the supposed airship. In another ten minutes, it was reported that the sound had made a detour around New York and was heading into the interior of the state. A little later, reports from Albany and other towns showed that the sound was coming straight toward us, and was then only about a hundred and fifty miles away.

I ordered the three aviators with me to get their planes ready. I stood by the phone for perhaps five minutes and heard Wilkinson just begin a sentence, "Capt. Anderson," he said, "the 'Thunderer' is—" and then the phone went dead. Nothing that I could do would re-establish the connection. A few minutes later I heard the roll of thunder to the south-east.

I cursed the phone and rushed for my plane. A few minutes later we were all in the air. As we rose above the surrounding hills we saw to the southeast the same kind of glow I had seen twenty days before.

We climbed desperately; for we knew that the "Thunderer's" ship was faster than ours and that, if we were to engage him, we must have the advantage of altitude.

About thirty-five miles to the southeast was Lake No. 4, one of the largest in the water-supply system. It was guarded by four combat planes; but I doubted that this were a sufficient defense

At five thousand feet we leveled off and sped toward the southeast. The *Sparrow Hawk* was behaving badly but, at that, I soon distanced the other planes. As I approached Lake No. 4 the glow increased and I felt the plane bucking a strong head wind. There was also an odor of ozone in the air. My motor was working worse. The ignition did not seem to be functioning properly and, though I had attempted to climb a little during the flight, I really lost altitude. Thus it happened that, as I approached Lake No. 4, the hills hid it from my gaze until I was almost over it. As I shot over the crest of the hills my motor died completely; but, for a moment, I hardly noticed this—so astounded was I at what I saw.

Perhaps five hundred feet above the lake was a boat-shaped airship about three hundred feet long. It had no wings and was supported, as well as I could tell, by a number of vertical propellers, somewhat after the manner of a helicopter. From each end of the craft a long cable dropped toward the surface of the lake, the ends being hidden by the blinding light near the surface. The water in the lake was seething and bubbling as though all the fires of hell were below it. Evidently, an immense electric current was passing through the cables. The humming sound which I had heard was coming from the airship, but was not very noticeable now because of the crackling and spitting of the current and the roar of the thunder. A powerful and gusty wind was blowing and the scent of ozone had become very strong. As the airship slowly cruised up and down the lake I could see the water literally disappear into the atmosphere. Already the lake shore showed a

wide band of damp earth which had formerly been covered with water.

The ship was out of effective range of my machine gun and, with my motor dead, I was a helpless spectator of the scene. I was having all I could do to manage my plane in the heavy winds—but I did keep the presence of mind to examine the strange airship as closely as I could at the distance. It was shaped somewhat like a racing yacht, having a long sharp keel and a pointed bow and stern. Its color was a dull grey. There were what looked like glass ports near the deck and several of them also were sunk in the keel, so that anyone in the ship could see below them. I watched these ports carefully but failed to see a single person inside the ship. It seemed to be made of steel and I decided that it would be futile to spray it with machine-gun bullets, even were I able. The only weapon we could use against it would be bombs dropped from above. I wondered where the four defending planes were until, in the bright light of the artificial "lightning," I saw the wreck of one almost below me, and lying on the beach near what had been the border of the lake. A smoldering pile beyond it was all that was left of another. During the time I was making these observations my plane was gliding slowly down and was now near the shore of the lake. In the strong winds I landed with a shock.

CHAPTER IV

The Casualties

THE lake was now almost entirely dry; finally the current was cut off and the grey airship leaped upward a thousand feet, as though on springs. Still rising rapidly, it vanished to the northeast with the speed of a shooting star.

The whole sight left me on the beach gasping with astonishment. I dazedly looked at my watch only to get a new shock. It was only five minutes to eleven! I had left Lake No. 3 at 10:25; so all that I had seen had happened in thirty minutes. I walked around the edge of what was now a great mud flat, with a little water in the deepest places. Finally I found the field telephone which had been placed there to keep the aviators in touch with the rest of the country. By the phone I located Lieutenant Allman, who told me that he was the sole survivor of the four pilots. It appeared that he and his three comrades had received notice by telephone of the approach of the grey airship and had reached an altitude of ten thousand feet before it actually appeared above the lake. They had dived on it, one after another and sprayed it with machine-gun bullets which apparently had no effect on it. They then attempted to climb above it again and drop bombs on it but the grey ship easily frustrated this plan. It rose straight up and then dropped on one of the planes with terrific force, cutting it almost in two with the sharp keel I had seen. It rammed another, showing greatly superior speed and maneuverability; then it flew over the third and dropped a bomb, which produced the flaming wreck I had seen. Paying no attention to the fourth plane it had lowered the cables, dropped some substance that looked like sand into the lake, and evidently turned on the electric current at once. At this point Lieut. Allman's engine went dead. This fact probably saved his life. Before he could attack the airship again he glided down, and landed near the edge of the lake, just as I did later.

Just then the phone rang and Dr. Wilkinson's voice said that he had been trying to get this station for some time but that the phone had been dead. I told him briefly what had occurred. Although evidently horrified, his first reaction was not wholly unrelieved, for he said: "Then I was right about the fellow's methods. I was sure that was just the way he would strike." He said also that the phone at Lake No. 3 was still dead. Looking in that direction I saw the same glow that had now become familiar to me. I reported this to Wilkinson and told him that, if the "Thunderer" did his work at No. 3 and other lakes as thoroughly as at No. 4, we might as well say good-bye to the water-supply system for some months.

As reports came in during the night our worst fears were realized. Every lake of any size in the system had been dried up, as the sun dries up a puddle in the road. It would be months before the system could be filled again. At many of the lakes the defending air squadrons had put up desperate fights; but the only result had been the death of almost half of the pilots. In every case where the planes had taken to the air before the approach of the grey airship, they had put up a fight which proved disastrous only to themselves. But, where notice had not been received in time for the planes to take the air, before the work of drying up the lakes began, the motors of the planes refused to start and the pilots were forced to remain mere spectators of the destruction of the lakes they guarded.

When this fact was brought out I realized why the motors refused to work, and cursed myself as a hopeless fool for not having guessed before. My motor had behaved badly in the storm twenty days ago, it had gone dead to-night while I was watching the "Thunderer" at work; but only now did I understand why. It was due to the electromagnetic field which surrounds every powerful electric current. It was the electromagnetic part of my engine, the *ignition*, that had gone wrong, and it had failed only while the "Thunderer" had his terrific current on. No wonder the phones and telegraph connections had failed; the powerful electric field created by the "Thunderer" had simply produced on them the same effects that the northern lights had frequently caused in the past. And, as for the engines, it has long been known that an electric field of sufficient intensity would put a gasoline motor out of commission. The experiment had even been tried in the last war; but it was abandoned because no means existed for producing fields of sufficient intensity and confining their action to a definite direction. It was clear that, if we expected to fight the "Thunderer" with airplanes we must find some defense against having our motors put out of commission.

If my reasoning was right, and I was sure it was, the *Sparrow Hawk* ought to fly now without any trouble, for the "Thunderer" was far away. I dashed over to it and tried to start the motor. It worked! I ran back to the phone to get the latest reports on "The Thunderer's" whereabouts. Wilkinson told me that the listening stations reported that after making a clean sweep of the water system, the "Thunderer" had headed out over the Atlantic again and that sound of his ship had been lost there. Wilkinson suggested that I fly to Washington and join them there.

A Distraught World

I REACHED Washington late that night and slept until almost noon the next day. While I slept, many reports had come in over the wires. During that morning, the "Thunderer" had visited Europe. Following much the same system he had used in America, he was leaving death and destruction in his wake. He

caused a terrific storm at Liverpool, and had sailed over the Thames destroying docks and shipping. In France, he gave his attention to the seacoast towns and the Seine with results that terrified the country. In Germany he caused a storm that almost wiped out Hamburg as a seaport and had attacked the water supply of Berlin, effecting the same destruction as with that of New York. Italy was treated to 100-mile winds, with terrific storms at Venice and Naples. Nor was Russia neglected; all lakes and ponds which formed part of the water supplies of Moscow and Leningrad were dried up. After leaving Russia, the grey airship disappeared.

All Europe was badly frightened. A special session of the League of Nations had been called. The religious fanatics in various countries were terror-stricken and proclaimed variously that the end of the world had come; and that the "Thunderer" was an angel of God sent to punish the earth for its wickedness. Mobs in Italy and parts of Russia had demanded immediate accession to his demands. The governments in most countries, however, had taken a firm stand. The prime minister of England had issued a proclamation announcing the damage done by the storm, particularly stressing the fact that women and children had been killed, and had stated that England would never give in to such an enemy as the "Thunderer." England was placed on a war basis, and its government sent an open measure to the League of Nations demanding that the world band together in an effort to crush the "Thunderer" as a common enemy. His announcement was cheered by great crowds in London.

The turmoil in our own country had been great. The morning newspapers had obtained somewhat garbled accounts of what had happened and had come out with blazing headlines in extra editions. Crowds filled the streets in New York eagerly buying each fresh edition. The situation there was not immediately dangerous, for there was sufficient water in the reservoirs nearest the city to supply its needs for a few days. Also, the government had commandeered several trains to carry drinking water to the city; and engineers were at work obtaining additional quantities of water from the Hudson by emergency mains in case of fire. It was clear, however, that in a few days the situation would be very critical. It was estimated that it would take several weeks before the waters of the Hudson could be piped in so as to give sufficient water pressure, and if any large fires occurred during the interval, the fire department would be almost helpless. To guard against such a contingency the National Guard was called out to patrol the streets. So far, the government had made no announcement of policy; but hastily-written editorials in the papers called upon it to seek out the "Thunderer" and his assistants (it was generally assumed that he had assistants) and bring them to the bar of justice.

Mr. Forbes called a meeting of our investigating committee that afternoon; and after the meeting we were besieged by reporters to know what had been decided. We gave out no information, however, for the simple reason that nothing had been decided. We were "stumped." From Wilkinson's clever deductions and my more or less lucky guess about the nature of the "Thunderer's" airship, we had been able to foresee the events of the previous night with considerable accuracy. But, in spite of that, we had been unable to defend our ports. The palin truth of it was that he could strike almost anywhere he pleased, and nothing we could do would stop him. His airship was worth hundreds of our planes in combat and, in the immense territory he could choose from, there was little chance of his coming in effective range of heavy artillery. In his activities on the coasts of European countries he had come in contact with warships once or twice but in the storm he created the ships were unable to get their guns into effective action. Also, it would be almost impossible to hit an airship that could either drop or rise vertically and move horizontally with such speed.

Wilkinson and Forbes had been in favor of an attempt to duplicate his airship; but the experts on aviation whom we called in agreed with me that it would be impossible. In the first place, we had no motor that could turn propellers with the necessary speed; and, in the second place, such a motor would soon shake both itself and its propeller to pieces. Wilkinson asserted that he knew it could be done because the "Thunderer" had done it. But when we asked him how, he was of course forced to admit that he did not know. Canning announced that the Secret Service forces of the country had joined with those of other nations, but he could report nothing definite. We gave up the problem for the present, and decided to meet again the following day.

The Last Warning

ON the following day we had a little further information and made some progress with our problem. Wilkinson had plotted the "Thunderer's" course across the Atlantic and over Europe and had figured out his approximate speed. His maximum speed had probably been around a thousand miles an hour. Mr. Forbes asked me, what was the highest speed one of our planes could make? I told him that the *Sparrow Hawk* was as fast as anything we had, and that its maximum was around 500 miles an hour. He wanted to know if that could not be increased by some device; but I reminded him that even the speediest plane would be useless in the face of an enemy who could kill its motor at will.

Wilkinson thought a minute, and then said that he could provide an absolute protection against the "Thunderer's" electric field of force. In answer to my surprised question, he explained that, although a magnetic field extends right through non-magnetic substances such as wood, fabric, etc., a thin layer of some magnetic substance such as iron will absorb it and provide a shield for a motor. A thin casing of metal would enable a motor to function perfectly in a strong electromagnetic field. It was decided that the motors of a large number of our fastest pursuit planes should be so protected.

We were encouraged at this bit of progress, and attacked the problem of increased speed for the planes with renewed energy. Again it was the keen analytic mind of Mr. Forbes that put us on the right track. He lacked the technical knowledge of either Wilkinson or myself; but his legal training enabled him to go right to the heart of a problem. He asked what factors controlled the speed of a plane. I answered that it depended primarily upon the power of the motor in proportion to its weight. A small plane, I explained, with, say, a 100-pound motor that developed 70 horsepower might be faster than a large plane with a 600-pound motor which developed only 300 horsepower, for the small plane carried less weight *per horsepower*. In order to materially increase the speed we must have more power *per pound* from the motor. He next asked me if there were any known means for increasing the horsepower per pound of motor weight.

This set me to thinking, and I remembered some facts that I had learned in training school but almost forgotten. The motors in general use in airplanes are of the internal-combustion variety, designed for the use of gasoline mixed with air. Almost every one is familiar with this fact; but what is not so generally known is that gasoline is not the only explosive that can be used. There are a large number of other fuels that can be used and some of them are vastly more powerful than gasoline. I remembered that, in the early days of automobile racing, various fuels had been experimented with and that picric acid combinations had been especially popular.

Two facts, however, had caused its almost total disappearance as a fuel. It is too powerful and uncertain as explosive. Gasoline is a fairly standard product, one gallon being like another, but the picric acid solutions lack uniformity and one gallon of it is likely to be twice as strong as another gallon though both come out of the same tank. This fact caused many blown-out cylinders and not a few deaths on the race tracks. Also, the acid corrodes the motor, making it impossible to get more than a few days' service from a car when a strong solution is used. These two facts caused racetrack authorities to bar the fuel and use of it from then on was made in secret.

I explained this to the committee, stating that I was willing to take my chances in a plane using almost any percentage of picric acid as fuel and that I believed that almost all the men in the flying corps would also chance it. However, I added, after five to ten hours' service (depending on the strength of the solution) the motor of every plane that used the stuff would be practically ruined. Wilkinson considered this for a few minutes and then suggested that the vital parts of the motor could be protected by some very resistant metal, such as gold or platinum. The expense was the main objection to this, but Mr. Forbes waved it aside, saying that we had the whole resources of the government back of us. So it was decided that a number of planes, including the *Sparrow Hawk*, were to be equipped with magnetic shields and platinum-plated engine parts. To make a plane using such a fuel safe, the cylinders should have been greatly strengthened to withstand the more powerful explosions; but to do so would involve changing the whole motor, and we had hardly time for that. We decided, therefore, that the aviators must take their chances on the reserve strength that is usually built into every motor.

The need for haste was clearly shown when, on the next day, the government received the second message from the "Thunderer." It was short and brusque:

> To the people of the United States:
>
> Unless my terms are complied with and a white flag is flown from the capitol on the tenth day after receipt of this notice, I will wipe the Great Lakes out of existence. You have seen something of my power: do you want another taste of it?
>
> THE THUNDERER.

Other governments received similar notices. And, at the same time reports of the "Thunderer's" activities in the Orient began to come in. After his dash over Russia, he had disappeared; but only to wax more destructive in his delayed visit to the East. Storms in the Red Sea had put the Suez Canal out of commission for a time at least. Calcutta was almost destroyed as a seaport. Rangoon had been nearly washed out of existence. China and Japan had been terrified.

CHAPTER V

Defiance!

NOR was the mere physical damage all. Millions of extremely religious people of the East had been thoroughly aroused and terrified. The races in India took it as a divine sign for them to arise and throw off the English yoke; and desperate fighting was going on in the ruins of the cities the "Thunderer" had visited. In Indo-China the terrified people had forced the government's hand, the white flag had been flown over the national banner and a proclamation of willingness to abide by any orders of the "Thunderer" had been issued. This was the first nation to submit.

The government officials, however, had secretly promised other governments resistance to "The Thunderer."

In China affairs were almost as bad. The "Thunderer" had flown up some of the larger rivers at night and the awe-inspiring spectacle of the drying up of the water had been seen by thousands. Most of them were uneducated and attributed supernatural powers to the "Thunderer." And, considering it useless to resist supernatural enemies, they demanded submission to his rule. So far, no official statement had been issued; but diplomats generally were of the opinion that, should the "Thunderer" threaten the country once more, it would give in at once.

Japan, because of its more efficient government, was, officially at least, much more belligerent. The government knew that, to remain in control, it could not give in. They issued, therefore, proclamations of defiance; but the mass of the people were badly frightened.

Amid this general panic the people of the United States remained, if not quiet, yet cool and courageous. Never have I felt more proud that I am an American than I did during those trying days. Nowhere had the "Thunderer" made greater demonstrations and threats than he did in America, but nowhere else was the spirit of resistance so determined.

I was fortunate enough to witness America's answer to the "Thunderer's" last note. An extra edition of the papers announced that an official proclamation would be made at the capitol at noon. By half-past eleven, the grounds around the capitol were crowded. The people were quiet, and discussed in low voices the events of the last few days. The papers had not been censored, and they were fully aware of the gravity of the danger that faced them. But, as I stood in the crowd and listened to their words, nowhere did I find many who wanted the government to submit to the unheard-of demands. Every one was for resistance, no matter what it might cost.

At noon, precisely, a small group appeared on the roof of the Capitol, and clustered around the base of the flagpole. The sun was almost directly overhead and they stood partially in the shadow of the flag that for almost two centuries had flown at the head of our troops, and at the masts of our ships in all quarters of the globe, and had never been lowered in disgrace.

The crowd watched in tense silence and, presently, the figure of a broad-shouldered, blond-headed young man separated himself from the others. He wore the uniform of a cadet at the National Military Academy, and to me, and I believe to everyone in the crowd, he seemed typical of the fine brand of young officers that West Point has been turning out ever since the Revolutionary War. (I later learned that he was the President's son home on furlough.) He advanced to the foot of the flagpole and began to climb it, hand over hand, with the aid of the flag ropes. A hammer could

be seen hanging from his belt.

A murmur of surprise came from the crowd. Had they been brought here merely to see a young man climb a pole? Showing great agility, the cadet went on up. Now he was almost at the top; now he had reached the flag. Sliding one leg through a loop in the rope he precariously seated himself upon the very top of the pole. With his right hand he took the hammer from his belt and with his left he pulled something from his pocket that glittered in the sunshine. He was going to drive a nail into the flagpole. Ah! He was nailing the flag to the pole! For a moment the crowd remained silent, and the first two blows of the hammer could be distinctly heard. Then such a roar went up as I have never heard since. How they cheered! It was the voice of a mighty people yelling defiance at an enemy. The flag was nailed to the pole! Never would it come down in token of submission! For fifteen minutes the cheering continued uninterrupted. The cadet finished his job and slid down the pole. Then the President came out on the steps of the Capitol and started to address the crowd, but roars of applause rendered his words unheard by any but those within a few feet of him. What need had the crowd of *words?* The answer of the government had been made symbolically. And it was the answer the American people wanted and expected from their government. The demonstration lasted for hours, and during it the papers came out. The whole front page of every paper was given up to the proclamation signed by the President of the United States of America. It read:

ONE MILLION DOLLARS REWARD FOR THE ARREST, DEAD OR ALIVE, OF THE PERSON STYLING HIMSELF THE "THUNDERER!"

One Hundred Thousand Dollars Reward for the Arrest, Dead or Alive, of Any of his Confederates. Ten Thousand Dollars reward for Any Information which May Prove of Use in Capturing him or Any of his Confederates.

The United States of America will pay to any person ....."

The Trial

THE crowd caught up these papers and the cheering broke out anew. Here was the way to answer the man who dared to threaten the people of America. A price on his head; and what a price!

The occurrences in Washington were communicated to the whole country by the press and by radio, and similar demonstrations occurred in the other cities of the country. Even in New York, where the "Thunderer" had struck hardest, the crowd cheered the government's answer for hours. There were meetings all over the country of people who wanted to help in some way. Thousands of young men surrounded the recruiting offices offering to volunteer for the army or navy. The government thanked all these people but was forced to tell them that their services were not needed. Long before men could be trained to fly or even be trained for the infantry or the navy, the struggle with the "Thunderer" would be over, one way or another. However, without much hope in its usefulness but more to give the people something to think about and reassure their minds, Canning organized a volunteer intelligence corps. The United States was divided into squares; and members of the volunteer corps were supposed to watch for and report any occurrences in their square that might have anything to do with the "Thunderer." This action was based upon the theory that somewhere he must have a base of operations and, if this base could be discovered, it would be easy to capture him. (Needless to say, the results from this organization were nil.)

It was not until the sixth day after the demonstration at the Capitol that the alterations in the *Sparrow Hawk* were complete. I determined to take the ship up for a trial flight, fully loaded and equipped, just as it would be for combat with the "Thunderer." To my surprise, Dr. Wilkinson insisted on going with me. It was in vain that I explained to him that the fuel (mainly picric acid) might blow us into eternity. He replied that it would be no more dangerous for him than for me; and that he had helped to supervise the alterations and wanted to see how they worked. I attempted to make him see the difference between a mere captain in the flying corps, risking his life in the line of duty, and a great scientist who could not be replaced. He simply snorted and climbed into the plane.

The mechanics, being wiser men in their way, started the motor and retired to a safe distance. Even before the plane left the ground, I could feel a greatly-increased power in the motor. With the throttle barely open, the propeller was giving a powerful pull. I turned on a little more power, intending to taxi down the field once or twice before taking off so as to get the "feel" of the plane. But the ship started with such a rush that, before I knew it, I was approaching the far boundary of the field at too great a speed to stop or turn. The only thing to do was to take off; so I pulled the joy-stick back and up we went with a powerful rush.

Once in the air the ship behaved more naturally except that, with the throttle only about half open, it acted as the plane had before at full speed. I circled once or twice over New York City. It was early evening, and stars were just appearing in the sky. The coincidence of time and place recalled to my mind the flight I had made five weeks before. Then the great city below me and the great country that stretched away to the west had seemed to dwell in absolute security and peace. Now I knew it to be engaged in a struggle to the death and, so far, a losing struggle, with a being who seemed to be as insane as he was powerful. Nature itself seemed to emphasize the contrast. That evening in the past had been beautiful with the clear light of summer. Now, a dark bank of clouds far to the east seemed to suggest the first storm of autumn.

The storm was in accord with my own mood, which was black and sullen because of my helplessness in dealing with the enemy that threatened my country. Drawn toward the sympathetic elements, I increased the speed slightly and headed toward the east. With the throttle half open we made 500 miles an hour and the motor throbbed and roared as loudly at it had done at top speed, before the alterations were made. At this rate New York and the coast dropped behind us like a shadow and we were soon entering the cloud region. Wilkinson remarked that a considerable storm was brewing and suggested that we skirt it to the north, since it seemed to be moving in a southwesterly direction. Desiring to match the speed of the plane against that of the storm, however, I headed the plane to the south. After half an hour's flight in this direction it became apparent that we were outdistancing the storm. It was well that this was so, for it was now night, and we needed the moonlight.

By this time I had learned the feel of the plane and was thinking of turning on the full power for the return trip. But I was rather reluctant to do so for,

although I was sure that the plane would make at least 800 miles an hour, I knew that such a speed would not only strain the motor but place more than double the usual strain on the wings and air surfaces. Unpleasant picture of crashes that I had seen at training school came into my mind. There was one cadet whom I had known, whose wings had come off in a vertical dive with the motor on. He had struck the roof of a three-story house and had to be dug out of the cellar, all mixed up with parts of the motor.

The "Thunderer" Found!

HERE Wilkinson interrupted my thoughts. "There seems to be something wrong with the motor," he said: "It is humming as though there were a short circuit or something of the kind."

I listened for a moment and heard a faint high-pitched humming sound. "That hum doesn't come from the motor," I said: "It must be something else. It sounds rather like—"

Wilkinson and I looked at each other, both seized at once by the same idea. "Don't tell me it is the 'Thunderer?'" he shouted.

"It sounds mighty like it," I said.

The sound came from east of south and, even as we listened, it became somewhat louder and shifted more to the south. Whatever was making the sound was evidently moving at high speed in a direction slightly south of west.

Excitement showing in his voice, Wilkinson said: "He was last heard of in Asia. If he were returning to America by way of Europe or the Mediterranean, that is just the course he would be on. Let's go for him!"

My answer was to increase the power and head the plane's nose toward the distant sound. In another minute the hum had become perceptibly louder. I increased the plane's speed until the air-speed indicators showed 650 miles per hour, and at the same time began to climb. If we were to deal with the "Thunderer" successfully it would have to be by means of one of the "little" fifty-pound bombs we carried, rather than by machine-gun fire. A little later, as the plane seemed to be standing the increased speed very well, I opened up the throttle still further.

Presently, far to the southwest, and somewhat below us, we saw a fast-moving light. Were we on the trail of the "Thunderer"? I glanced at Wilkinson and saw his eyes fairly snapping with excitement. "Can't you give her a little more speed?" he asked anxiously.

I answered by increasing our speed until I could feel the motor shake and quiver with the power of the explosions. Even in the danger and deadly seriousness of the chase, I could not help smiling at the eagerness of this staid man of science in what was little more than a man hunt.

Wilkinson kept a pair of night-glasses on the distant light. "It *is* the "Thunderer!" he exclaimed: "I can see the boat-like hull you described. We are gaining on him!"

By this time we were again approaching the coast and a hasty estimate of our speed convinced me that we must be somewhere in the region of North Carolina.

So far, the ship ahead of us showed no signs of suspecting our pursuit; and, desiring that we remain unknown, I decided to climb still higher and dive on the ship in front of us with the motor off. My memory of the ease with which the "Thunderer's" ship could maneuver convinced me that our best chance of success was to remain unsuspected until our bombs exploded on his deck. I felt no compunction whatever about thus blowing him into eternity without the slightest warning; for he was responsible for the deaths of hundreds of men, women and children.

I climbed to about fifteen thousand feet, some five thousand feet above the ship in front of us, whose grey hull could just be distinguished in the moonlight. Still the "Thunderer" seemed unaware of our presence and I attributed this to the fact that the sound of his own engines prevented him from hearing ours. I cut the motor and put our nose down in a steep dive. The wind whistled through the wings and we approached the grey ship like a swooping hawk. Now it was only two thousand feet below us, and I was preparing to level off and release the bombs when, suddenly, the ship dropped with the speed of a falling comet. I was altogether taken by surprise. One minute, the grey ship had been only a short distance below us and we were approaching it as though it were stationary; and the next it had dropped five or six thousand feet and was rapidly disappearing into the night!

I naturally attributed this maneuver to a knowledge of our presence and a desire to avoid us, so I put the plane into a slightly-dropping spiral glide, and searched the air below us for sight of our quarry. Wilkinson uttered an exclamation of disgust at our fiasco and turned his glasses downward. We were now some distance inland, but our altitude cloaked the earth in impenetrable darkness. Into this darkness the grey ship had completely disappeared. I was about to follow it down by sound alone when a brilliant light showed far below. Both Wilkinson and I were astounded at what we saw through the glasses.

The ground was wild and desolate. (We later found it was a part of the arid and almost uninhabited coast land of North Carolina; but this was not what we noticed first.) In the center of the circle of illumination were two buildings. One, low and rambling, was evidently a dwelling house—the other was clearly a hangar for the grey airship, and the lights were flares for its landing. We had tracked the "Thunderer" to his lair!

CHAPTER VI

Through the Window

IN a few minutes the flares were extinguished and only a few small points of light, probably ordinary electrics, marked the position of the buildings. Wilkinson and I consulted on what to be done Should we leave and return with a force sufficient to make sure of a capture, or should we land and try to terminate the adventure by ourselves? There were objections to both plans. If we left we might not be able to find the place again; for we had only the vaguest idea of where we were. Also, it might be days before we could return with a sufficient force of planes and ground forces to make sure of a capture. And, in the mean time, our quarry might escape. As to the second plan, if we landed by ourselves we were practically sure to be greatly outnumbered (for we thought the crew of the grey airship must be at least fifteen or twenty men) and might be captured or killed with our invaluable knowledge. We finally decided on a kind of compromise. We would land and reconnoiter the place and then, if it looked too formidable for us alone, we would leave it and return as soon as possible with additional forces.

In accordance with this plan we glided down. By the time we were within two thousand feet or so of the ground we could make out something of its contour in

the light of the half-moon. I picked what seemed to be a vacant field, about a mile and a half from the buildings. The ground was smooth and we landed almost noiselessly. A good road ran past the field in the direction of the buildings, and we moved slowly along its edge, ready at the first sign of danger to hid in the bushes that lined it. At this rate it took up more than half an hour to reach the vicinity of the buildings, and during this time the weather had changed considerably. The storm we had distanced earlier in the evening was beginning to catch up with us; for streamers of cloud obscured the moon and an occasional flash of lightning showed in the northeast. As we reached the buildings the first few scattering drops of rain began to fall. We were delighted at this; for the darkness and rain would cover our movements.

We surveyed the buildings from the shelter of a clump of bushes. One, evidently the hangar, was long and rectangular in shape. It was entirely dark. The other, low and rambling, consisted of a central portion and two wings at right angles to the central part. The road passed immediately in front of the central portion and a low racing car was parked by the side of the road. No lights showed in one wing of the house nor in what we could see of the other; but two windows in the central portion were illuminated. So far as we could tell, there was absolutely nothing approximating a watch or guard of any sort.

Both Wilkinson and I were armed with pistols and we finally decided that a look through one of those windows would be worth the risk involved. We crept forward, depending on the rain and darkness, to conceal our approach. Wilkinson went to one window and I to the other. My head just came a little above the sill and I peered in from one corner, keeping myself ready to dodge out of sight in case anyone inside the room should look toward the window which was open an inch or two from the bottom.

I saw what was evidently the library of the house. It was a large room, with most of its wall space lined with books; the furnishings were of a rich though outmoded fashion. A cheerful fire crackled in an open fireplace. A man was seated in a high-backed chair, before a rich mahogany table covered by a mass of papers, busily writing. His back was partially turned toward me but, every now and then, he would pause in his writing as though to think, and when he did so, his profile became visible.

It was hard to tell his age; he might have been anywhere between thirty and fifty. His face was the most intellectual I have ever seen. His forehead was so high as to appear narrow, though this was not actually the case. A timeless wisdom, such as I once thought I saw in the eyes of a Hindu idol which were composed of two priceless emeralds, seemed to shine from his face. His nose was large; but straight and well formed. His mouth was almost straight with thick but powerfully compressed lips. His chin was well-shaped but not especially prominent, seeming to indicate a sensitive nature. The whole face would have been called handsome were it not that it produced so many other stronger and extraordinary impressions on a beholder. The dominant impression that it produced on me was that of profound, depthless wisdom and calm. I could not imagine that face distorted with rage, fear or any other unworthy emotion. At first, he seemed above the emotions of ordinary human beings.

How long I gazed, lost in awe and astonishment, I do not know. It was the movement of the man in the room that finally terminated my gaping observations. He walked to the far side of the room and pulled an ancient bell-cord. A moment later a white-headed negro entered.

"Caesar," said the master, and I noticed that his voice was deep and calm, in harmony with his appearance: "You may retire. I shall not need you again tonight."

The old negro mumbled, "Good night, massa," and was about to leave the room when the master stopped him with a gesture.

"Have Noah and Mary gone?" he asked.

"Yes, suh," replied the negro, "they locked up the devil ship and went over to Mr. Taylor's plantation to see Mary's brother. They been gone in the flivver over half an hour ago, suh. Mary's brother mighty sick and they 'low they maybe not get back for a couple of days. You told me you wuz going to Wilmington tomorrow, so I told 'em they could go, suh."

"That's all," said the master, "Good night, Caesar."

The "Thunderer" Revealed

THE old negro bowed and shuffled out. The master arose and stood before the fire and as this position brought his face toward the window I decided that it was time for me to leave.

I crept back to the clump of bushes and found Wilkinson already there. Forestalling his questions, I asked him what he had seen. He said that his window opened on a vacant hall, and wanted to know what I had been looking at so long. I told him, and he whistled low in astonishment.

"By George," he said, "it sounds as though it must be the 'Thunderer' himself, and he is probably alone except for that old negro servant. Where do you suppose the crew of the 'devil ship' can be? Do you think that there is any possibility that the fellow could run the ship by himself or only with the help of two or three negroes?"

I promptly answered that I couldn't guess what the "Thunderer" could do.

He reflected for a moment:

"In any case, Captain, whether there is a crew for the ship or not, I believe, from what you told me, that he is alone in the house at present (except for the negro servant) and that we will never have a better chance of capturing him. If we wait, we shall probably lose him. He has already shown his intention of going somewhere tomorrow. I think that by all means we should act boldly, and at once."

I agreed with him and, after some discussion, we agreed that Wilkinson should walk openly up to the front door and knock while I watched through the window and saw that our quarry did not escape.

I again crept to the window and, a moment later, I heard a bell ring. "The Thunderer" (as I did not doubt the identity of the man) laid aside his pen and moved toward what I judged to be the front of the house. Guessing that he was going to open the door I ran around to the front and joined Wilkinson. We stood with our pistols in our hands. A firm but quiet step approached the door, and then it was thrown open by the man I had seen in the room .

On seeing us he did not show much surprise. In fact, he seemed to show a curious mixture of deep regret and relief.

"So you have come at last, gentlemen," he said: "I had expected you long before. Come in. This is no night to remain talking on the doorstep."

As we obeyed him, astounded, he too seemed a little surprised.

"What?" he said: "Only two of you? You do me small honor, sirs. I had expected at least a company of infantry and probably a squadron of aircraft."

When we did not reply he continued: "But perhaps I do you an injustice. You have left your companions outside?"

Up to this point Wilkinson and I remained in astonished silence. Why had the man been expecting us? Had we walked into a carefully-prepared trap? Had he known of our pursuit and purposely led us on? Wilkinson was the first to recover.

"The whereabouts of our companions are our concern, Dr. Leboeuf Dreher," he said: "What concerns you is that Capt. Anderson and myself place you under arrest. I advise you to make no resistance, for we will take no chances of your getting away, and will shoot with pleasure at the first false move so dangerous a criminal as yourself."

The stranger glanced at him and smiled slightly in recognition.

"Ah," he said. "My old acquaintance of the Royal Physical Society, Wilkinson, and still prating of 'dangerous criminals' as though there were a moral yardstick by which they might be measured. It is strange, Doctor, that you do not still believe in fairies."

Wilkinson flushed at this bit of raillery as though he were a school-boy reprimanded by his teacher. But he did not answer except to take a tighter grip on his pistol.

The stranger glanced out of the door at the rain which was now falling heavily and then said: "Suppose you gentlemen come back to my library and discuss the matter for a few minutes. I suppose you hardly desire to drag me out in a storm like this."

We considered this and decided that the request was reasonable. So, keeping the stranger covered, we followed him down the hall to the room I had seen through the window. On the way Wilkinson murmured to me that he had known the stranger, in England, as a very brilliant but erratic American scientist who was resident there.

Dreher, as I will now call him, drew up three chairs before the fire and gestured us to the two outside ones saying that he would take the middle one where we could keep an eye on him.

For a moment no one in this strange gathering spoke. I was busy estimating the distance of the bell cord from Dreher and looking for any electric buttons or other means of summoning anyone to his assistance. There were none. Wilkinson was watching Dreher, and Dreher was looking into the fire. The rain was beating against the window and flashes of lightning were followed by deep peals of thunder.

Presently Dreher arose. "Since you are here," he said, "You might as well take some light refreshment." Under our watchful eyes he removed a tall bottle, three glasses, and a box of fine cigars from a cabinet. Remarking that it was Grande Champagne of 1830, that rarest of all vintages, he filled the three glasses and gestured to us to choose ours. After we had done so, he raised his own to his lips and drained it in tacit assurance that he was not attempting to drug us. Thinking that his conduct was carefully calculated to get us off our guard, I declined the wine and cigars, and taking no part in the ensuing conversation between Wilkinson and Dreher, devoted myself to watching for any suspicious move on his part. Wilkinson sipped the wine with apparent appreciation and lit one of the cigars. It was he who spoke first.

"So you admit that you are the 'Thunderer'?" he asked.

"Oh yes," replied the other easily: "I never waste time denying the obvious. You would not be here with pistols in your hands if you did not have a pretty good idea that I am the 'Thunderer,' and, even if you are not sure you can easily obtain plenty of proofs by searching the premises."

The "Thunderer" Explains

"WOULD you mind telling us why you expected us?" asked Wilkinson.

"Not at all," was the answer, "I did not expect you two particularly. It was merely that I expected someone. I did not enter on the course I have taken without careful consideration. As I stated in my messages, I believe that I am by far the most intelligent person now alive. Anyone who looks at the matter from an unbiased point of view will at once see the immense advantages gained by having such a person the supreme ruler of the world. Naturally, I do not expect you to agree with that statement because you are prejudiced by the fact that you will be one of the ruled. Nor do I expect the average person to take even as unprejudiced a view of the question as you two may be able to do. To the minds of the great mass of the people, poisoned by the 'freedom' which they now think they have, I would necessarily appear as the worst kind of despot. I knew this and, therefore, I knew that the hand of every man would be against me. And although I am the most intelligent, and probably the most powerful man in the world, yet I matched my single brain and power against combined brains and power of all the other people in the world, as an intelligent being. I recognized that the odds were very much against me. Indeed, they were so much against me that I am surprised that I have succeeded as far as I have; and I consider that fact a proof of my ability. Thus, when I heard someone at the door tonight I thought it possible, and even probable, that it was a force to arrest me."

"If you thought your success so improbable," asked Wilkinson, "why did you make the attempt?"

"Well," was the reply, "that is a hard question to answer. There were several reasons. I think, however, that it was due to a great desire on my part to test out my theories. It would have been a great thing, a thing that has never been done before, for a scientist to have the world for his laboratory and men and women as specimens of his experiments. Scientists have theorized for years over what would happen if the development of man and women could be controlled."

Dreher spoke in the most matter-of-fact tone, just as though he were discussing his dinner menu or some other equally trivial matter. Indeed, all through the remarkable conversation, he showed no signs of emotion and spoke of human beings, just as we speak of criminals. It was the inhuman character of his messages and acts which had first aroused my suspicion that he was insane, and what he said on this night made me sure that this was the case. It was not an intellectual insanity. I think that, were it left to my judgment, I would admit without question his claim to be the most intelligent man that ever lived; but it was an emotional insanity, or at the very least, an abnormal condition which robbed him of all emotion.

He continued.

"It was worth any risk to have even a chance of carrying out so great an idea. Imagine what could be done! You know how grains and foodstuffs of all kinds have been improved by artificial selection. Prac-

tically all foods that we now eat were once worthless weeds, and it is only by the most rigid selection, that is by sowing the *best* specimens of each crop and blocking out all the inferior strains, that we now have the quality and variety of our present foods. The same thing has been done with domestic animals. Think what would happen if the same principles were applied to the human species. Why, the level could be enormously raised in three or four generations. Men of my ability would be as common as men of Captain Anderson's are now. There would be only a negligible number of feeble-minded persons; and they could be scientifically and painlessly extinguished, instead of being a burden on the community as they are now."

He paused here and Wilkinson said, "I remember that some years ago you created quite a flurry by stating that it would be much better for the human species if doctors abandoned trying to cure individuals to devote themselves solely to discovering the laws of genetics; and investigated the principles of medicine without trying to apply them to the individual, but to the betterment of the race as a whole."

"Exactly," said Dreher; "For example, there is Captain Anderson sitting over there who probably thinks I am as crazy as a badger; yet he and his type encourage the absolutely absurd medical system that now exists. What could possibly be more unreasonable than that doctors shall patch up an increasing number of human wrecks every year and let them live to have descendants who are also poor physical specimens? The mere fact that a man has any disease is absolute proof that he is susceptible to disease; and, since susceptibility to disease is very largely an inherited characteristic that man's descendants will also be susceptible to disease. I touched on this briefly in my original message to the governments. The logical thing to do is clearly to let all who have diseases die of them; or, if they do not die, at least prevent them from having offspring. In that way the race will gradually become immune to disease.

"What happens in nature? A sick animal dies. Because of that fact, diseases are almost unknown among wild animals. But what happens among men? Why, the sick man receives all kinds of attention and the medical profession consider it their highest duty to prolong life of some miserable wretch for a few paltry years. I gave the figures in my message. You can't deny that what I claim is coming to pass. The human species is rapidly degenerating, both mentally and physically. Your governments are too cowardly and weak, too much under the thumb of the mediocre and sentimental, to deal with the problem. They have refused even to consider it up to this time. It is only I that can remedy the situation; and you, two people that consider yourselves sane, come to place me under the power of a government that will without doubt wipe out of existence the only chance for the rational development of the human species. Satan must be chuckling in Hell over the affair."

CHAPTER VII

A Man Alone

THIS plausible but unfair tirade aroused me to ask, "If you are so solicitous of the well-being of the human species, Dr. Dreher, why did you wipe several thousands of them out of existence in your recent activities? Frankly, it seems only just to me that our government should deal with you as you dealt with them."

Dreher turned toward Wilkinson with some exasperation evident in his face. "That's the kind of thing I am up against," he said: "He doesn't even understand what I am talking about."

Turning to me, he said: "What difference does it make whether or not those few thousands of peope were killed? The effect on the species as a whole was negligible. They would all have died in the next fifty or seventy-five years anyway. The life of an individual is not important, except as his existence affects that of the species. Now, my existence is worth millions of theirs, because I can affect the course of the whole species."

I was about to make heated retort that perhaps the existence of the people who were killed was just as important to them as Dreher's existence to him; but Wilkinson interrupted.

"We are gaining nothing by this discussion," he said: "It is clear that our opinions are unalterably opposed. But, if you will be so kind, Doctor, we would like to hear something of the means by which you accomplished your astounding results."

Dreher smiled.

"What?" he said: "The famous Dr. Wilkinson whom the press reports as knowing almost as much about the 'Thunderer' as does the 'Thunderer' himself, wants enlightenment as to how those very ordinary results were accomplished?"

Wilkinson explained his own and my theories of the way in which Dreher had accomplished his marvelous results, and Dreher admitted that they were largely correct.

"You gentlemen are to be complimented," he said: "I had no idea that your government had such accurate information as to my methods. As to the means by which I produced the powerful electric currents required, they were simple enough. It has long been thought that an electric current is merely a stream of negative electrons. Every atom is composed of a number of negative electrons grouped around a positive nucleus. Therefore, to produce a current of any intensity all that is required is to break down the atom into its component parts and set the electrons flowing along some conductor. The heavier substances, of course, contain a larger number of atoms and consequently will produce more current when broken down. It took only a few hundred pounds of lead to produce the current necessary to destroy New York's water supply."

In answer to another of Wilkinson's questions he went on:

"I have no accomplices or confederates. I run the ship entirely by myself. It was this fact that delayed my appearance in the East. I had to bring my ship to rest in a deserted part of Asia and get some sleep before attacking China, and the rest of the Orient. The same necessity delayed my return to this country. The ship is fitted with electrical control devices and it is quite easy for one man to run it. Various parts of it were constructed according to special orders in factories all over the world. No one factory made enough parts to know what the whole was intended for. I assembled the parts with the help of some negro laborers who have since sailed to Liberia. In any case, they were too ignorant to know the purposes of the ship.

"I have a staff of three ignorant but devoted servants here. Two of them—Noah, my general handy man, and Mary his wife—are away. Old Caesar, my butler and valet, has gone to bed. These three are too ignorant to be guilty of any crime and I am going to

depend on you gentlemen to see that they are not molested in any way as a result of my arrest. They are well provided for in my will. Is there anything further that you would like to know?"

Wilkinson asked as to the motive power of the ship and as to the means of breaking up the atom.

In answer Dreher invited us into his laboratory for a demonstration and with some hesitation we accepted.

The laboratory took up the whole farther wing of the house. In it was a small model of the grey airship and Dreher pointed out its unusual features. The ship was run by electricity, and most of the large space which we had thought must contain a crew was a storage room for lead to produce the enormous currents that were used in creating the storms. The vertical propellers that kept the ship in the air, whether it was moving laterally or not, were composed of a new metal made by Dreher. He stated that the technical experts were correct in telling us that no substance we knew could stand the terrible strain put on it by rotation at the speed necessary to keep the grey ship in the air.

Wilkinson freely expressed his admiration and amazement at Dreher's achievements.

"Why, Doctor," he said, "if you can break down the atom you can produce any kind of substance; you can transmute elements; you can do almost anything!"

Escape!

DREHER explained that he had not, as yet, had sufficient time to investigate all the possibilities of his own inventions.

Next he showed us the machine he used for breaking up the atom. It was a glass tube about twenty inches long, with two metallic electrodes at either end. He explained that his plan was a simple development of the already well-known "Cathode Rays."

"It has long been known that the cathode rays are negative electrons," he said, "but they can only be produced by means of a pre-existing electric current, in other words, it is only a case of electricity being produced by electricity. My change in the system, however, produces a direct current by breaking down some heavy substance, preferably lead, into its component parts and setting the electrons free."

While he was speaking he was busily moving about adjusting connections and tightening screws here and there; just as though he were an inventor about to give a demonstration to two promoters in the hopes of interesting them in his project.

Vivid flashes of lightning could be seen through the windows and the noise of the thunder at times drowned out Dreher's voice. The storm was evidently at its height. Dreher paid no attention to it.

"Watch," he said, and pulled a switch.

At once there was a blinding flash of light and a loud explosion.

"The deuce!" I heard Dreher say: "I have blown the light fuse. Just a minute, gentlemen."

For a minute, just a minute—but that minute was long enough—we were fooled. Then I saw Dreher's body outlined against a flash of lightning in a window at the far end of the laboratory. I jerked my pistol up and fired twice, but too late. He had jumped from the window before I shot

Wilkinson and I ran for the window, tripping over everything in the dark laboratory. We reached it just in time to see Dreher disappear into the hangar. We jumped to the ground and dashed after him. Slipping and stumbling on the wet grounds, we reached the hangar, only to find locked the door through which Dreher had gone. For a moment we pounded futilely against it; then heard a sound as though a thousand swarms of bees were loose in the hangar. A moment later, the roof folded back and the grey airship gracefully shot up in the air. I could almost have sworn that against the sound of the propellers and the beating of the rain I heard a low laugh from the ship.

We gaped at the ship like fools for a moment, then, we ran in the direction in which we had left the *Sparrow Hawk*. Before going a hundred yards Wilkinson stopped and said hopelessly: "It's no use. It will take us at least five or ten minutes to reach the plane and by that time Dreher will be a hundred miles away."

I suddenly remembered the car parked in the road. We jumped into it. It was a Mercedes roadster. Feverishly I let in the clutch and started. Once under way, I pushed the accelerator flat against the floor and held it there. I believe that wild mile-and-a-half ride was the nearest I have come to death in my life. The car picked up like a leaping greyhound. In two or three hundred yards the speedometer registered 80 miles an hour. I did not look at it after that; but I am sure the car picked up speed for the whole of the trip. The road was wet and slippery as glass. We lurched from one side to the other and I verily believe that our great speed itself tended to prevent us from skidding. When I saw a lone tree that was near the spot where we had left the plane I slammed on the foot and hand brakes, and the car rewarded us by skidding into the ditch and out again into the field where we had left the plane. It turned over on its side, saving us the trouble of getting out. Without stopping we jumped into the plane.

The motor was hard to start and, for a desperate moment, I was afraid that water had seeped into it. Then, with a comforting roar, it picked up. We taxied down the field and went up in one of the steepest climbs I have ever made. If the motor had stalled we would not have had a chance. But it did not fail; it seemed to have the power to lift the plane almost vertically.

The storm was still raging; the lightning flashed and the thunder roared all around us while, as a background for the aerial display we could hear the humming of the grey airship.

End of the "Thunderer"

THE instant we gained sufficient altitude we headed for the sound. As we neared the house we saw the grey airship in the intermittent flashes of lightning. Suddenly a searchlight beamed from the ship, playing full on the house and hangar, above which it still hovered. Then there was a blinding flash of light and a terrific explosion that dwarfed the sound of the storm. Dreher had blown his house and hangar out of existence with an aerial bomb! We would be unable to discover his secrets from the records in his laboratory.

The light on the ship disappeared, as it shot away to the northeast with the speed of a bullet I pulled the throttle wide open on our plane and roared after him. The motor throbbed and shook and the plane bucked and dipped in the strong winds each moment as though it would come to pieces. But it held! We were gaining slightly. It was in vain that the ship before us changed its course: we could always follow by the sound of the propellers.

Dreher headed out to sea and rose steeply at the same time in an effort to throw us off the track. In ten minutes we rose to fourteen thousand feet. Soon the storm was below us, and we flew in the clear moonlight. Still we rose. The altimeter showed twenty thousand feet and the air was cold with a cold that

seemed almost like that of interstellar space. Still we gained; and still Dreher rose. At something like 30,000 feet, an altitude that the *Sparrow Hawk* could never have attained with gasoline as fuel, Dreher evidently found his ceiling. He cut his forward motion and dropped earthward like a falling stone.

I put our nose almost straight down and dove after him with the motor full on. The *Sparrow Hawk* swooped in a way to justify its name. Pulled by our motor, in addition to the force of gravity, we probably reached a speed that man has never rivaled before or since. We gained rapidly on the ship below us. Then it disappeared in the clouds. A second later we too hit the clouds. The storm was even worse here than it had been on land. We later found that we were off Cape Hatteras, one of the worst points for storms on the Atlantic Coast.

As we emerged on the lower side of the clouds, we saw Dreher's ship directly below us. We were forcing it down almost to the level of the waves which leaped upward as though reaching for something. I leveled off, in preparation for dropping my bombs. And then Dreher gave his answer. He started his vertical propellers and the ship leapt upward to meet us. He expected to catch us coming down at full speed and ram us out of existence with the metal hull of his ship. It was a plan that would have worked easily; for the comparatively frail *Sparrow Hawk* would not have injured his ship much in a collision.

The scene is burned into my memory indelibly. A particularly brilliant flash of lightning showed Dreher's ship only a short distance below us. On its stern, flapping in the stiff wind, was his flag—a golden thunderbolt on a white background; a short distance below was the angry sea. The scene lasted for just one part of a split second. Then I dropped my whole load of bombs, and sideslipped desperately to get out of the path of the explosion that I knew was coming.

It came with an ear-breaking concussion; the plane swayed, pitched, and then with a sickening lurch turned completely over. Our undercarriage was wet with spray from the leaping waves when I again got the *Sparrow Hawk* under control. I came around in a wide turn to see what had become of Dreher's ship. When we reached the spot where we had released our bombs we turned our searchlight on the sea, and flew low in an attempt to find some trace of the man who had single-handed fought the world. Nothing but the tossing sea rewarded our search. A metal hull loaded with lead does not float.

It was Wilkinson who spoke the thought that was in the minds of both of us.

"He was a dangerous public enemy," he said simply, "but a great scientist, and a brave man."

I turned the nose of the *Sparrow Hawk* toward land. Our mission was ended.

THE END.

The Death's Head Meteor

(*Continued from page* 633)

couldn't be possible that the meteor had missed the great planet for which it had been headed so squarely. He looked about him in a confused manner, not quite brought to his entire senses. His brain was still hazy, and he felt greatly exhausted as his wandering eyes fell upon the dial board. It was registering top speed!

With great effort, he painfully drew himself towards the brown glass window and looked out—into the intense darkness of space in which were set myriads of scintillating stars. He looked on the other side for the death's head meteor, but it was gone. All that remained of it was a chunk about three feet thick and as long, around which the wreckage of the twisted grapples lay entwined. Above the meteoric fragment, the three drills still churned, one of them broken in half. Jan looked behind him, and out of the window he could discern a small red blot, Mars, far to the rear, and growing smaller.

For a moment he could not understand the miracle which had occurred. Then gradually it dawned upon him that he had been grasped from the jaws of death just in time. The presence of the meteor's chunk and the oppressive heat within the space car gave testimony of his deliverance before entering the atmosphere of Mars.

The space car containing the unconscious young astronaut had whirled off through the outer layer of Martian atmosphere and into the coldness of space once more. This accounted for the suffocating heat inside the flyer where the intense friction from the thin, rarefied air had heated the space ship. He must have penetrated it at a terrible speed on his outward flight. He had been unconscious for a bare five minutes, and already he was nearly fifty thousand miles from Mars. He started the air rejuvenator to clear the hot, stuffy interior of the craft, after which he turned the flyer and headed back for Mars.

In the radio receiving station on the Earth, the big glass bulb set in the wall above the operator's head suddenly flashed, and an electric spark snapped and crackled as it closed the gap between two metal cylinders. The operator mechanically adjusted the dials and switches, and the cylinder containing the aluminum sheet began turning, filling the room with its droning noise. As the bulb grew dark once more, and the roller came to a stop, the aluminum sheet cleaved from off the roller and fell to the desk before the operator.

Before placing it upon the transmitter plate and pressing the button marked "Meteorological Bureau," the silver-capped operator reviewed the message curiously. It was the report of one of the astronauts employed by the government Bureau of Meteorology, Jan Trenton by name. It seemed that he was stopping over at Mars while his ship underwent certain repairs, and that he would report for further duty the next day.

Such is the life of an astronaut.

THE END.

AVIATION NEWS OF THE MONTH

CONSTRUCTION

Last-Minute Rush Brings Airplanes to Safety Contest

By THOMAS CARROLL

Test Pilot for Daniel Guggenheim Safe Aircraft Competition

(Copyright 1929 by Science Service)

PRACTICALLY the entire entry list of the Daniel Guggenheim Safe Aircraft Competition was submitted within two or three days before the closing of the contest. When this contest to develop and discover safer airplanes was announced in 1927 it was little expected that no serious competitors would be received for test prior to the final week of the contest. There seems to have been a reluctance on the part of the designers, both foreign and domestic, to submit half hatched ideas in this somewhat revolutionary aeronautical contest. It is on that account that entries have been withheld, and only at this late date is it possible to give a list of the competitors. Formal entry of twenty-seven various types of aircraft has been made during the past two years, but these entrants merely filled out the form. All but less than a dozen have at this time either withdrawn, or have failed to complete their entry by submitting an airplane for test.

[illegible] Bird), the Schroeder Wentworth [illegible] Alfaro and the stock Brunner & Winkle Bird were submitted "in person," but were [illegible] airplanes, together with the large [illegible] the competition can be considered a complete [illegible] of the [illegible] have already been flown [illegible] s to make flying safer, is sure to be accomplished.

Public Safety Demonstration Object of Guggenheim Contest

By THOMAS CARROLL,

Test Pilot for Daniel Guggenheim Safe Aircraft Competition

(Copyright 1929 by Science Service)

TO prove to the public that airplanes can be made safe is the object of the Daniel Guggenheim Safe Aircraft Competition, sponsored [illegible] Daniel Guggenheim Fund for the Pro[illegible] of Aeronautics. A demonstration of [illegible], prescribing specifications for [illegible] t can be regarded as safe, was conceived as the method of stimulating progressive design on the part of the manufacturers and confidence on the part of the public. Prizes totalling $150,000 made the competition financially attractive. It had been said, humorously, that a safe airplane is like a good Indian. It was the purpose of the competition to prove differently.

The definition of what might be considered a safe airplane, a very difficult task, was accomplished by laying out most comprehensive and intelligent specifications. Manufacturers and designers were invited to submit their airplanes in order to demonstrate claims as to their safety.

A safe aircraft which is not of obvious usefulness would not be a step forward. The first specification provided that the craft under test should be useful; to demonstrate utility it must carry a useful load of at least five pounds per horsepower of its engine, and it must further satisfy a speed requirement of carrying at least a pilot and one passenger at a minimum high speed of 110 miles per hour. It must also demonstrate its ability to climb in order to get in and out of fields, and the requirement in this regard is that it shall be able to climb at [illegible] feet per [illegible] the gr[illegible]

With these as basic requirements, safety tests are next applied. The ability to fly under [illegible] at low speeds is considered [illegible] lute importance, and therefore the maximum figure of 35 miles per hour has been prescribed for lowest-speed flight under power, and 38 miles per hour as the gliding speed without power.

It was considered of importance that the aircraft should be able to land and take off in a [illegible] quired that the aircraft must be capable of coming to rest not more than 100 feet from the point at which it first meets the ground. In taking off, it must be able to leave the ground [illegible] a run of not more than 300 feet. Incident[illegible] must be capable of taking off in that [illegible] height, located not more than 200 feet from the end of the landing run prescribed.

Its stability and manoeuverability must also be demonstrated. It must be stable in nearly [illegible] [illegible] any attention of the pilot, [illegible]gh its own inherent stability, the plane must be able to recover itself in not more than 500 feet.

There is no limitation upon the means by which the desired performance can be attained, the design may be either evolutionary or revolutionary. It may be accomplished by a skillful refinement and improvement of airplanes as we know them. On the other hand, it is entirely permissible, so long as the aircraft is heavier than air, to attain the ends by a radical departure from any generally-used aircraft.

Parachutes Carry Machine Guns and Crews

THE technique of landing machine guns and their crews is constantly being improved, according to a report received recently by the Chief of the Army Air Corps. In a test at San Antonio, Texas, two machine guns were dropped [illegible] parachutes and put into action by crews of three men each, who descended from their planes to the ground by parachute, and assembled and repaired the guns for firing in a few moments. The guns are sent to the ground by means of a new machine-gun parachute bag, which operates automatically; it contains the gun, ammunition, and a gallon of water for use in cooling

Gyroscope Stabilizer Automatic Pilot

THE Sperry Gyroscope Stabilizer, the product of eighteen years of research, has had a most successful demonstration. Used in a Ford tri-motor plane, it kept the craft on an [illegible] reheved to a considerable extent the strain on [illegible]

In effect, the gyroscope stabilizer is an auto[illegible] [illegible] too small to be observed by flyers. The device [illegible] horizontally and the other vertically. A series [illegible] which in turn operate controls leading to [illegible]ons and rudder surfaces. The gyroscopes are driven electrically power being supplied for them and for the mechanical operation of the [illegible] by means of a wind[illegible]r-driven electric [illegible]

In operation, the peculiar properties of the gyroscopes cause the instruments to retain their fixed positions, and when the plane moves later[illegible] the direction or [illegible] [illegible] [illegible]

OPERATION

Declares Air Sickness Cure Simple

IN the *Bulletin* of the Daniel Guggenheim Fund for the Promotion of Aeronautics, Inc., Harry F. Guggenheim, president of the Fund, declares that the cure for air sickness is simple, and that the illness is, at best, a minor point in aviation. Air sickness, like sea sickness, is a minor, but difficult problem in passenger travel, one which, as yet, has not been entirely solved. A solution would, in all likelihood, greatly increase traffic by airplane.

The report summarizes the results of a study of air sickness in Italy, Germany, Great Britain and the United States; and the conclusions reached upheld the fact that air sickness is much less prevalent than sea sickness. It is the result of two factors—psychological and physical. The first takes into account the fear felt by persons who lack experience in the air, and who are naturally afraid of great heights. The second depends to a large extent upon proper ventilation. It has been found that air sickness is always greater in unventilated cabins. The development of a better system of ventilation will mean a great deal for the development of air travel.

New "Rescue Vest" Prevents Seaplane Drownings

THERE has been perfected a new oxygen breathing device, intended to prevent the drowning of aviators trapped by seaplanes that crash in the water, or are caught under their parachutes after a jump that brings them down into a river or the sea. The new contrivance is a combined vest and belt equipped with two long pieces of rubber hose (through one of the latter the wearer inhales and through the other he exhales), a nose clip, to prevent the sudden rush of water from suffocating him, a tiny canister containing soda lime which serves to purify the breath by eliminating carbon dioxide, and a bottle containing sufficient oxygen to keep a man afloat for at least half an hour after he has jumped into the water from his 'chute. However, if it so happens that the flier has not had a chance to use his parachute and therefore hits the water while yet in the plane, he can readily gain access to a larger bottle always carried as an emergency measure in the ship. This will supply a human being with oxygen for about an hour and a half.

R-101 Only Dirigible Using Heavy Oil

THE great new British dirigible *R-101* is the only lighter than air craft to use heavy oil as fuel for its engines. This is a great protection another safety factor, says T. T. C. Martyn in the *New York Times*, for in the past most of the accidents to airships have been caused by the firing of gasoline.

In the new dirigible, which has a greater diameter than the *Graf Zeppelin*, and which is powered by five Diesel engines of 650 h.p. each, the lifting power is supplied by hydrogen, an admittedly dangerous substance. This may be surprising in view of the fact that every precaution for safety has been taken. However helium, the new lifting gas, which is non-inflammable, has not as great a lifting power as hydrogen.

DO-X Carries 169 People

THE latest amazing achievement of the great *DO-X* seaplane is the transportation of 169 people at once. This passenger load sets a record for the number of passengers on any type of aircraft. It is popularly supposed that the great airplanes have the greatest passenger carrying capacity. But as yet no aircraft has ever been built to transport as many as the *DO-X* has obtained. It has been tested to the limits of her capacity.

Compute Chance of Death in Airplane

PERSONS who are still afraid of flying should be encouraged by the news that the average flying airplane with a crew of [illegible] passenger will fly for 4,000 hours before it meets with a serious accident. These are the statistics compiled by the Aeronautical Society of America. The report stated that last year [illegible] passengers were carried out of about 50,000 who were carried safely and landed safely. The records also show that licensed pilots were 15 times safer than the first one hundred of the year 1,000 during the first six months of the year the fatality rate during the year was highest among the most experienced pilots, where it was 40 per 1,000.

Russian Fliers Complete Long Flight

THE *Land of the Soviets*, the huge monoplane which carried four Russian aviators half-way around the world a distance of 15,000 miles—has completed its flight and put Russia definitely into the ranks of those nations foremost in aeronautical development.

Under the leadership of Simon Shestakof, chief pilot, the four occupants of the *Land of the Soviets* started from Moscow last August, and, traveling eastward crossed Siberia and made a landing in Japan. From there in the course of the flight was eastward across the Pacific to the United States, and thence to New York, where the Russian aviators were welcomed by Colonel Lindbergh. In view of the fact that the Soviet government is not recognized by this nation, the flight, bringing about so much evidence of international goodwill, is believed to hasten the international understanding which is developing at the present time.

Will Chart Nation for Airways

THE completion of the first sectional "U. S. airway chart," mapping approximately 41,000 square miles of territory in the vicinity of Detroit, is the opening step in a project which has for its end the mapping of the entire country.

The new charts will be square, in contrast to the "strip" maps employed at the present time. They will show towns and cities, railroads, highways, power-transmission lines, aids to navigation, such as revolving light beacons and blinkers, directional and marker radio beacons, and landing fields. Ground elevations will be indicated in steps from sea level to 1,000 feet, 1,000 to 2,000 feet, 2,000 to 3,000, and then in multiples of 2,000 feet up to 9,000. The last step will include elevations of from 9,000 feet to the maximum. This point is Mount Whitney, in California, 14,898 feet above sea level.

"Aviation News of the Month"

portrays in plain, yet concise language every important aviation advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 40 aviation magazines and newspapers are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, makers and distributors of planes, etc.

Radio Device Installed in Tail of Plane

A NEW lightweight radio transmitter and receiver, so convenient that it can be installed in the tail of a plane (rather than in the cabin, as formerly) has given satisfactory service to the Transcontinental Air Transport Company. It might be thought that the added weight in the tail of the machine would unbalance the craft, but there has been no trouble whatsoever.

The apparatus is so convenient that it can be installed in five minutes. As to its efficiency, its maximum transmission range thus far is 617 miles. In the future it will unquestionably be of more service than it has been as yet.

New Inexpensive Plane Tested

A NEW airplane, costing only $800, and equipped with a single motor of 8 h.p., has been tested [illegible] recently. The machine known as *The Fleetwing* has a tail but is designed like an arrow with a very short fuselage for the [illegible]. It is the cheapest approach to the [illegible] that [illegible].

The [illegible] attained a speed of 8 miles per hour. This is quite possible according to experts by the type of propeller used, the 'washer' variety. All the controls are on the wing and are operated separately on either side with [illegible] as well as [illegible].

Aviators Endanger Lives in Altitude Flights

WHEN aviators fly to great heights, such as the altitude of 50,000 feet to which Lieut. Apollo Soucek, Navy pilot, aspires, they are endangering their lives, even though they use oxygen devices. This is the conclusion drawn from researches by Dr. Charles Richet, Jr., of the University of Paris, who has conducted tests for the French government.

Working with rabbits, he found that they sometimes suffered a delayed death after coming through with seeming success, the experience of being subjected to low atmospheric pressure as exists at high altitudes. This was especially the case with the animals which were subjected to work after their experience, but some died without the stress of work being a factor. Prof. Richet sets about 45,000 feet as the limit of altitude that can be reached by man with safety even when equipped with extra oxygen, unless the whole body is enclosed in a pressure chamber that shields him from the effects of the great height. Twenty thousand feet is the limit when no oxygen is supplied.

Will Guide Atlantic Flights by Radio

WILLIAM LOTH, a French engineer, has invented a method whereby there will be an enormous improvement in the science of navigation of airplanes and airships.

The new discovery is based on the principle of light beams used to guide ships over dangerout areas, the meeting point of the two lights indicating the path. It will provide a system of Hertzian waves to be transmitted from two distant points toward each other, their meeting point being the path to be followed by the flying machine. The emission of the waves will be intermittent, and on meeting they will create a signal which will be detected by apparatus on the aircraft. According to the manner in which the signals are received, pilots will know at what distance they are from the set track, and, consequently, they will not require compasses, maps, and calculations.

Seadromes Fulfill Predictions of Writers

AN editorial in the *New York World* commenting humorously on the development of the [illegible] as visualized by people with wild imaginations, and artists with brushes even wilder, admits that so far as the seadromes are concerned, the predictions seem to have been fulfilled. Referring in particular to the floating islands manufactured by the Seadrome Company, from designs by Edward H. Armstrong, the newspaper agrees that the 'dromes "should do pretty well, even in a blizzard." This recognition by a cynical editorial writer should encourage the builders of seadromes—if they need encouragement.

End Survey of Flood Area

PRESIDENT HOOVER'S plan for checking the floods of the Mississippi will be aided to a great extent by the completion of the aerial survey of five states made recently. By means of this survey, army engineers will obtain a bird's-eye view of the entire area to be protected.

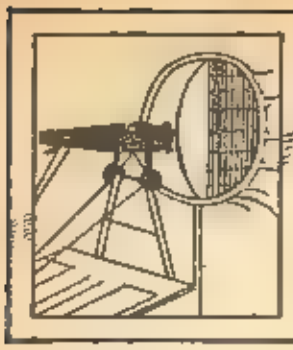
Covering parts of Missouri, Arkansas, Kentucky, Mississippi, and Tennessee, the fliers mapped an area of 8,581 square miles, and took 11,419 negatives, from which almost 50,000 prints have been prepared. Some of the views were taken at an altitude of two miles.

Many Countries Study Flying in Fog

THE Guggenheim Fund for the Promotion of Aeronautics has, for the last two years, devoted a great deal of time and money to one of the major problems of operation—flying in fog. According to Lauren D. Lyman, writing in the *New York Times*, special studies in fog have been undertaken by scientists in the United States, England, France, Holland, and Germany, and the work already done covers research in fog dissipation, the development of means to locate landing fields in spite of fog, instrument development, and the improvement of fog penetration by light rays.

Lieutenant Doolittle, of the United States demonstrated the efficiency of instruments when he guided a plane from a covered cockpit. At the present time, a great deal of attention is being given to radio beacons as aids to direction finding, these beacons operating in connection with the localizing of stations.

(*Continued on Page 656*)



AVIATION FORUM

This department is open to readers who wish to have answered questions on Aviation. As far as space will permit, all questions deemed of general interest to our readers will be answered here. And where possible illustrations will be used to answer the questions. Queries should be brief and not more than three should be put in any letter. Address all communications to the Editor

Does the Sun Repulse Planets?

Editor, Aviation Forum:

1. Please tell me how a rocket can function in airless space?

2. How, also, can they have flaming tails? I've always understood that oxygen was necessary for combustion.

3. Was the idea of gravity between the sun and the planets ever considered in a reverse way: that there is a force from the sun keeping the planets in their orbits and preventing them from approaching the sun?

ROY BRAUND,
2202 West 85th Street,
Cleveland, Ohio.

(1. By referring to the illustration accompanying Mr. Hausz's letter on this page Mr. Braund will see that the internal action of the rocket is not at all dependent on the medium outside. We can all imagine a pistol being fired in airless space and the projectile acquiring quite a velocity. The action in a rocket is just the same except that the whole "gun" travels together and the exhaust gases are allowed to escape. It is true, however, that in airless space the exhaust gases would escape more quickly because of the absence of pressure against them and thus they will lose their energy more quickly. But this is more than balanced by the fact that there is no friction in airless space to impede the rocket's progress.

2. A flaming tail simply means that when the gases reach the air they are still hot enough to be glowing. This has nothing to do with the question of oxygen, it means simply that the gases are still "burning." Oxygen is necessary to burn anything but it is not necessary to an explosion. Dynamite, for example, will explode in absence of the presence of oxygen. And an explosion of dynamite will furnish energy to propel a rocket just as well as burning a fuel.

3. The only force that keeps our planets away from the sun is the centrifugal force acquired in their motion around the sun. This is a force that acts opposite to the gravitational pull of the sun. This force however is absent in the absence of the motion of the planets and in such a case there would be nothing to stop them from plunging into the sun. There have been some scientists who have spoken vaguely of various planets repulsing each other because they possessed like electrical charges, but this has never been verified.—*Editor.*)

Stunting in a Monoplane

Editor, Aviation Forum

I have often noticed that I seldom see a monoplane stunting. Is this because it is more difficult to stunt in a monoplane? If so, why?

Is the Spanish Auto-Gyro the only one existing?

GORDON MacLEAN,
Flushing, N. Y.

(Biplanes are used more often than monoplanes in stunt flying because of their greater manoeuverability. The larger wing surface insures easier handling and greater stability. Otherwise there is very little difference. Biplanes, because there are more in use than there are monoplanes, are seen more frequently. This, also, may account for the fact that you have seen few monoplanes "stunting."

The Cierva Auto-Gyro, [helicopter] is the only one of importance of which anything is known at present.—*Editor.*)

Limit of Rocket Speed

Editor, Aviation Forum

Due to other questions on the same subject in your *Question and Answer columns* I am taking the liberty of asking you a few questions on rocket propulsion.

1. I understand that the gases try to explode equally in every direction, escaping with but little resistance through the opening at the back but hitting the front hard enough to cause it to react forward. A good simile is a marble shot squarely at another one; when they meet the one that was struck starts forward with the imparted speed while the other stops short or rebounds. Is my reasoning faulty?

2. Would not the rocket speed be limited to the maximum speed of the molecules of the fuel (only several thousand miles per hour) or would only the acceleration be limited?

3. Would hydrogen and oxygen in the proportions of water make a good fuel?

Then finally I would be much obliged if other readers of this great magazine who are interested in a Science Club would get in touch with me.

WALTER HAUSZ,
10458 122nd Street,
Richmond Hill, L. I., N. Y.

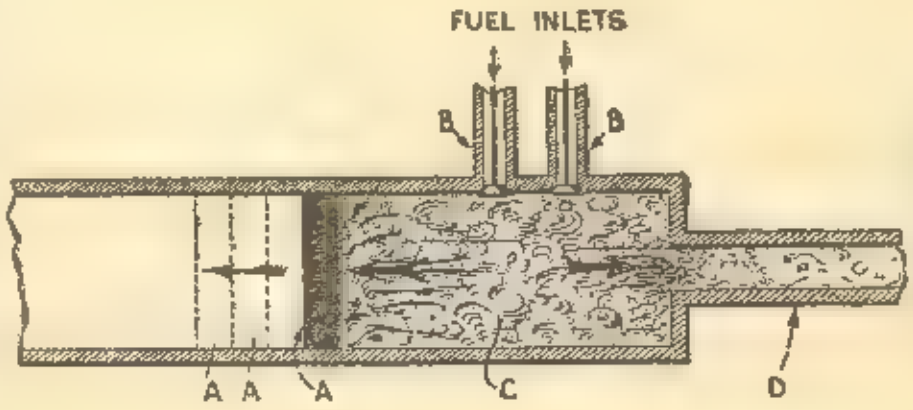
(1. Mr. Hausz's idea of the way a rocket operates is quite correct. The fuel suddenly explodes and forms a gas whose volume is many times that of the original fuel. This creates a tremendous pressure which acts equally in all directions. One of those directions is against the front of the rocket. Now, inasmuch as the exhaust is open, what happens is that the gas presses the rocket forward in its attempt to expand and having done so escapes through the exhaust. The principle is somewhat the same as the firing of a gun. The explosion of the powder in the bullet causes a tremendous sudden force in all directions. The force acting toward the bullet shoots it through the barrel into the air. The force acting toward the gun is taken up in the recoil. These forces are equal. Now the difference is that in a gun the bullet [the rocket] moves while the gun itself [the explosion chamber in the rocket] remains stationery. Therefore in a rocket plane where it is necessary to carry everything into the air the recoil is effected by allowing the gases to escape through an exhaust after having given the rocket its impetus forward.

The analogy of the marble is not quite complete for the gases give up only a part of their energy to the rocket. They use up most of it in expanding and rushing through the exhaust. What is comparable is the illustration shown here. We have a cylinder in which there is a movable piston "A." There are two fuel inlets "BB." "C" is the explosion chamber and "D" the exhaust. It can be easily seen that with the fuel exploding in "C," before it can expand sufficiently to use up its energy in passing through "D" it will press with a tremendous force in every direction and impart to the piston "A" part of its energy, thus moving "A." Now "A" in this case may be considered the rocket itself and if "A" instead of being movable is fixed rigidly to the cylinder then the whole cylinder will move forward.

2. No. The only thing that limits the speed of a rocket is the force or energy given to the rocket by the explosion. By making the explosions rapid enough and of sufficient power any speed that the body can stand may be obtained. So in the figure shown here if the rocket is going 3,000 miles an hour and the gases escaping by their own velocity at 2,000 miles an hour the relative motion through this chamber is 5,000 miles an hour. Then again it is possible to have as many combustion chambers as you wish and by timing them the rocket can be given a continuous succession of impulses. To clear up a misunderstanding the gases and the rocket do not have the same velocity, no more than a bat swung by a ball player and the ball that he hits have the same velocity. The energy is equal or nearly so.

The acceleration would be dependent only on the relationship between the force in the explosions and the opposing medium. That is if the rocket is in airless space and is not opposed by a strong gravitational pull of any planet it will not lose any of the velocity attained and it can be accelerated as fast as energy can be delivered to it. The formula in this case is: Force = mass [of rocket] X its acceleration. So with the mass of the rocket a constant figure [in fact it would really decrease as part of the fuel carried along is used up] the acceleration varies directly as the force. Double one, the other is doubled. And the force depends on the frequency and intensity of the explosions.

3. Yes. Because of the intensity of the explosions concerned hydrogen and oxygen, in liquid form, constitutes one of the most prominent of the fuels being considered.—*Editor.*)



Illustrating an action comparable to that of the rocket. By the explosion of the fuel which enters by BB a tremendous pressure is developed in cylinder C which moves piston A.

Bullet-proof Airplanes

Editor, Aviation Forum:

Would it be possible (but it's probably been thought of before) to armor military airplanes with Bovite or some other bullet-proof material? The armor is to be placed only in vital spots, such as around the cockpit, inside the motor cowl (or whatever the jigger that surrounds the motor is called) and around the gas tank. By making the pilot's "windshield" of bullet-proof glass, his goggles of the same material, and adding a helmet which would completely cover his face (a helmet of Bovite, and a jumper of the same material for his upper torso, it seems he would indeed be a bullet-proof *kombre*.

I have no love for wars—but if they're going to have 'em, this might be good protection for pilots.

D. G. MARTINAM,
932 Adams St., Brownsville, Texas.

(This question about Bovite cannot be answered with finality until the weight and properties of the metal are better known. During the war steel armor plate was tried, but pilots preferred to do without it, for the sake of having the plane lighter and easier to handle. If Bovite is all you say it is, and if it is as light as aluminum, or some other light metal, it may be used. The weight added by the armor, however, could be better used in war, it is felt, by a heavier armament of the plane.—*Editor.*)

THE READER AIRS HIS VIEWS

IN this department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brick-bat.

All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

A New Convert Speaks

Editor, AIR WONDER STORIES:

A few months ago I paused in front of a local drug store and glanced over the array of magazines presented there. One book particularly attracted my attention. The name of it was, AIR WONDER STORIES. Being always interested in science, although I know very little about it, I bought it then and there. And I have never been sorry; in fact far from it. [illegible] issued to me. A world of [illegible] but I [illegible] interest [illegible] science fiction has [illegible] Gravity" are certainly [illegible] class B comes the [illegible] the "Silent Destroyer." I'll tell you why I [illegible] They held my interest all the way through. The B was good; but that air master certainly did have some power. Too much, I think, for one man. The C was also pretty good but I didn't stand how "Ted" Addison passed from the [illegible] the [illegible]

Since those four stor[illegible] I have enjoyed the following issues without comment.

My comments of SCIENCE WONDER STORIES will be centered on the last, the November issue.

"The Phantom Televiewer" was great. "The Killing Flash" was good, but I didn't understand it, Mr. Gernsback. It wasn't quite clear to me. The "Stellar Missile" was wonderful! I wish I could say the "Gold Triumvirate" was good. It really was, but not from a standpoint of interest. The facts were all right. I don't care for "Space Dwellers" at all, too fantastic. I hereby pronounce the "Human Termites" the greatest science fiction story.

I am one of the many boys who are reading science fiction in my high school alone. The fact is, many of them claim it as their hobbies. We can give oral reports on it in class and the teacher always says they are good.

WALLACE COONEY,
1326 Ciretinella Ave., Sawtelle, Cal.

(We are glad to welcome Mr. Cooney to the many thousands of converts to AIR WONDER STORIES. His information about the use of science fiction in classes is to us very interesting, and a coming to fruition of our hopes that this might be so. In order for our stories to fulfil their purpose they must be educational. And we are sure that they are.—*Editor.*)

No Racial Prejudice, Says Harl Vincent

Editor, AIR WONDER STORIES:

In the November issue of AIR WONDER STORIES Mr. Victor Endersby takes exception to "The Yellow Air Peril" on the grounds of religious and racial prejudice. Yet, in his own comments, he attacks the "spirit of Christian nations" and speaks of "Asiatic [illegible] me greatly, [illegible] I am [illegible]

I wish to point out that in "The Yellow Air Peril" there was no reference to the doctrines or the Buddhists, nor was there a single expression of disbelief in the faith or of criticism [illegible] fevers by a group of non-religious and power-seeking agitators and moneyed interests. It is a laudable trait in all religions that its adherents are convinced that their own belief is the best and finest there is and, usually by peaceful missionary methods, they endeavor to spread their belief throughout the world. It is unfortunate that such feelings have sometimes been used to their own advantage by unscrupulous men whose only interest in the faith was of the nature set forth in "The Yellow Air Peril."

The charge of racial prejudice is equally ridiculous. All nations and races were [illegible] the [illegible] [illegible] the [illegible] aggressors in their stories; and I am sure they intend no more to express prejudicial views than do English and American writers when they write of the Germans or the yellow or black race in depicting possible future wars. To avoid reading of such things, Mr. Endersby must, perforce, limit himself to a very small proportion of the magazines and books of the present day, for it is to be encountered in practically all of them.

It seems to me that this critic has, in his letter, displayed the very feeling of which he complains. It is he who raised the issues of race and religion, not the author of the story.

HARL VINCENT,
Ridgewood, N. J.

(We agree with Mr. Vincent that no prejudice against Buddhism or any other religion [illegible] to [illegible] ests were cap[illegible] the [illegible] ends. Buddh[illegible] tiall[illegible] against any national, racial, political or social group. This is meant to be an emphatic statement. We mean it absolutely.—*Editor.*)

No War with Asia

[illegible] they involve the United [illegible] with Europe or Asia. I firmly believe that we should not print stories of that sort. We should in all our stories of the future picture the nations of the world as at peace. That is what we should work for and much of our work is lost if we are constantly thinking war. I do not care how many wars your stories have between the Planets, but please ask your authors to avoid international wars. Please avoid printing such tales.

Such tales are also in very bad taste—inasmuch as they are always glorifying the United States at the expense of some other nation. Your magazine has faithful readers in other lands than ours, and it is not right to insult those readers.

I enjoy your scientific notes. I taught science many years before I retired from the profession of teaching.

I regret your printing that canard about the 815-mile per hour fly. I do not believe that Dr. Howard ever made any such statement. I have great respect for Dr. Howard. As a scientist yourself you should have been above allowing such a statement to appear in your magazine.

At the bottom of page 466 do you not make a slip? You say rightly that the rocket would work best in a vacuum, but when you say "as nothing impedes the exhaust" I am confident that your mind slipped. As the impeding of the exhaust would expend itself in driving forward the rocket then surely the rocket would work best in air. BUT—in air the resistance offered to the forward motion of the rocket by the air would probably more than offset the increased push of the exhaust gasses against the air. Of this I am not sure. It would need some careful figuring.

ALLEN LATHAM,
Norwichtown, Conn.

(Mr. Latham's observations on maintaining international peace illustrate our own views. We have always avoided antagonizing any nation through a fiction story. However, it is impossible to have every war story on an interplanetary basis. Assuredly our authors have nothing against any other race.

Concerning the operation of rockets, Mr. Latham is right. Rockets work best in air because in a vacuum the gasses escape too quickly and expend their energy too quickly in escaping. But this is more than overbalanced by the loss of air friction in a vacuum. This question is discussed in "Aviation Forum" in the answer to the letter of Mr. Braund.

As to the 815-mile an hour fly mentioned by Dr. Howard, this was an authentic news item for which of course we rely on the reputation of the paper. We do not print "canards," or sensational news items. Whatever we say in our news sections is a reliably reported fact.—*Editor.*)

"The Flying Legion" the Most Exciting

[illegible] form I will at least have a copy in a magazine.

I notice John R. Kiessling has caused quite a flurry because of his letter in the October issue. He does not seem to realize the only way he can have long stories is by means of serials. My opinions on the questions asked at the bottom of the letter are:

1. I like serials not running more than three issues but believe as does R[illegible]etz that a book [illegible] pages and find one story covers about seventy pages I feel I have got more than my money's worth, and we all like to have that feeling.

2. I do not believe a serial should be run unless it would cover from two hundred and fifty to three hundred pages if printed in book form. Otherwise it should run in one issue as a long novelette. A serial should run two issues or at the most three. There are a few books that should be published, but would take more. The only one I know of at the present moment is George Allan England's "Darkness and Dawn" which would take at least six issues.

3. Instead of having one serial begin as another ends I believe two serials should begin and end at the same time.

Now I wish to touch on another subject but one few people have mentioned. That is the author's portraits. Instead of having a rough sketch why not publish a portrait that is about three by three and a half inches? At the bottom add another one and a half inches for a description. I am sure the readers would like this better.

"Cities in the Air," is the best story you have given us so far, but I can not help expecting that the "Flying Legion" will far outdo it.

CURTIS TAYLOR,
102 Grove Place,
Utica, N. Y.

(The editors agree with Mr. Taylor thoroughly in his opinion about "The Flying Legion." No one was able to stop reading it before the last word was reached. Truly it was exciting! It seems to us that Mr. Taylor gets what he calls his "money's worth." Our short stories and serials balance well, we think. There is an excess of neither. Of course, if we were to print novelettes in each issue, we would have little room left for the short stories, and our readers would get little variety. This question, also, is still an open one, and we invite the opinions of other readers. As to the reprints, we have had so many requests the reprints, we have had so many requests that we have started our library of "Science Fiction Classics" with "Between the Worlds" by Garret Smith as the first story.—*Editor.*)

(*Continued on page 661*)

If You Were DYING TO-NIGHT

and I offered something that would give you ten years more to live, would you take it? You'd grab it. Well, fellows, I've got it, but don't wait till you're dying or it won't do you a bit of good. It will then be too late. Right now is the time. Tomorrow or any day, some disease will get you and if you have not equipped yourself to fight it off, you re gone. I don't claim to cure disease. I am not a medical doctor, but I'll put you in such condition that the doctor will starve to death waiting for you to take sick. Can you imagine a mosquito trying to bite a brick wall? A fine chance.

A RE-BUILT MAN

I like to get the weak ones. I delight in getting hold of a man who has been turned down as hopeless by others. It's easy enough to finish a task that's more than half done. But give me the weak, sickly chap and watch him grow stronger. That's what I like. It's fun to me because I know I can do it and I like to give the other fellow the laugh. I don't just give you a veneer of muscle that looks good to others. I work on you both inside and out. I not only put big, massive arms and legs on you, but I build up those inner muscles that surround your vital organs. The kind that give you real pep and energy, the kind that fire you with ambition and the courage to tackle anything set before you.

ALL I ASK IS NINETY DAYS

Who says it takes years to get in shape? Show me the man who makes any such claims and I'll make him eat his words. I'll put one full inch on your arm in just 30 days. Yes, and two full inches on your chest in the same length of time. Meanwhile, I'm putting life and pep into your old back-bone. And from then on, just watch 'em grow. At the end of thirty days you won't know yourself. Your whole body will take on an entirely different appearance. But you've only started. Now comes the real works. I've only built my foundation. I want just 60 days more (90 in all) and you'll make those friends of yours who think they're strong look like something the cat dragged in.

A REAL MAN

When I'm through with you you're a real man. The kind that can prove it. You will be able to do things you had thought impossible. And the beauty of it is you keep on going. Your deep, full chest breathes in rich, pure air, stimulating your blood and making you just bubble over with vim and vitality. Your huge square shoulders and your massive muscular arms have that craving for the exercise of a regular he-man. You have the flash to your eye and the pep to your step that will make you admired and sought after in both the business and social world.

This is no idle prattle, fellows. If you doubt me make me prove it. Go ahead, I like it. I have already done this for thousands of others and my records are unchallenged. What I have done for them, I will do for you. Come then, for time flies and every day counts. Let this very day be the beginning of new life to you.

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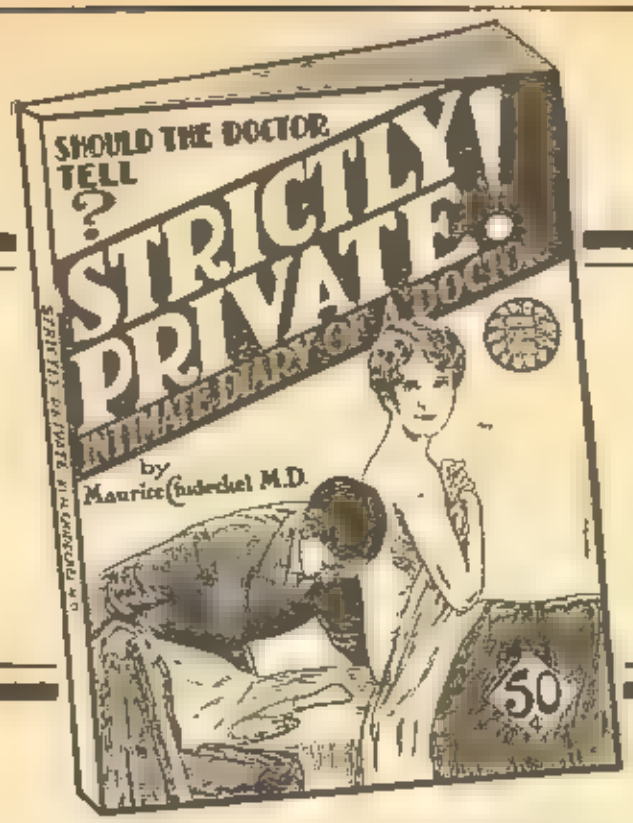

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AVIATION NEWS
OPERATION

(*Continued from page 652*)

Methods of Docking Airships Being Considered

GERMANY is assiduously studying proper ways and means to bring lighter-than-air craft safely to rest on water and land. The Germans consider the revolving shed, similar to the mooring mast at Lakehurst, N. J., as a very good means of landing airships safely. However, water offers a better surface than land for alighting and floating sheds are considered more desirable than land mooring masts; for land has many hard objects that might damage the ship. It was for this reason that Count Zeppelin originated the method of landing on a floating platform, which could be floated into a shed. A novel proposal has been made by O. Krell for landing on ice. He recommends a cable with an anchor attached which could be dropped from the ship. He suggests the use of an electrically-heated, plate-shaped anchor which could be dropped and allowed to melt into the ice. The electric current would then be turned off and the anchor permitted to freeze in the ice. The cable could be used also for conveying persons and material up and down between the ship and the ice. To weigh the anchor, the current could be turned on, and the ice surrounding it melted. Another idea is to hitch the airship to a low, floating mooring mast. The platform on which the mast rests would also act as a storage room for various equipment, such as gas flasks, etc. The "hitching post," however would be subject to considerable pull, at the top of the mast, from the wind.

Planes Have Bombing Range of 500 Miles

FRANCIS D. WALTON, writing in the *New York World*, reports that the Army Ordnance Association has proved the superiority of planes over guns as bombarding instruments. Army attack planes, equipped with five and six guns, and carrying small bombs, demonstrated that they could wipe out artillery units faster than opposing gunfire could be expected to do it. Planes are superior also for demolishing marching columns. The supreme test lies in the range of heavy bombing capacity. The sixteen inch gun, the largest in use, fires a 2100-pound shell thirty miles. Bombers carry 4000 pound demolition bombs, which, with the speed of the planes, are effective for a [illegible] of 500 miles.

Center Circle of Light Marks New Field

THE new landing field at Salt Lake City, Utah, is marked in a novel manner by an illuminated circle, set in the ground, and 100 feet in diameter. The marker consists of a concrete circle, flush with the ground, in which are set 31 incandescent 60-watt lamps, making the center of the field easily visible at night. For use in the daytime, the circle is painted a bright yellow.

Eventually, all the runways of the field will be marked in this manner. The plan is to place lights similarly along both sides of each runway.

Fliers Considered Best Air Station Builders

IN the opinion of Major Thomas G. Lanphier, former commander of the First Pursuit Group, Army Air Corps, who is now associated with the development of commercial aviation, the flyer is the ideal airport builder. The construction of airports requires a combination of engineering skill and practical flying experience which only the experienced aviator can supply.

Burney Plans Sea Landing Dirigible

THE latest development in aviation is the amphibian airship—the dirigible which will be able to land on water. No lighter than-air craft has ever been constructed to do this, but Commander Sir Dennis Burney, of the British air forces, who designed the great R 100, has completed a working model of a huge ship which promises great work as experimental revolution ze the theories of [illegible] construction.

In his latest work Commander Burney has laid plans for the largest British airship. It will be [illegible] times as large as the *Graf Zeppelin*, [illegible] one half times as large as the R 100. Able to alight on water as well as on land, it is being designed for mooring to a buoy floating sheltered harbors. In addition the great ship will be able to maneuver in a thirty-five mile wind, and it can be towed to dock as though it were an ocean liner.

(*Continued on page 658*)

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AVIATION NEWS
GENERAL

(Continued from page 656)

Safest in Front Line During Next War

THAT the progress of aviation, especially in the development of bombing planes will make large cities dangerous places to be in, is the opinion of Major V. Casajus, Military Attache of the Spanish Embassy, as expressed in *Aeronautics*. In the event of a war, both sides will immediately despatch great numbers of bombing planes to the enemy centers of population. A few well-laid one-ton bombs will do much to destroy the civilian morale. In that event it would be safer to be an infantryman in the first-line trenches. The bombers would be refueled in the air and thus have a much greater range than ever before. Major Casajus is also interested in a proposed Spain-to-United States air service on a twenty four hour schedule. Here again refueling in the air will play an important part for planes will be sent up to meet the air-liner at the Azores, Bermudas, and possibly Porto Rico.

Goddard Announces New Liquid Rocket Propellant

DEVELOPMENT of a liquid propellant for rockets that will make possible airplanes much faster than those of the present day is announced in a copyrighted article prepared for *Science Service* by R. H. Goddard, professor of physics at Clark University. Prof Goddard was asked to comment on the recent experiments in Germany with a rocket-propelled airplane. His statement follows:

"The recent rocket-plan flight in Germany raises the question as to just what bearing this result may have on aviation. According to German aeronautical journals, these rocket auto and airplane experiments are being carried out along the lines of the experimental work that I performed at Clark University in 1916 and which was published by the Smithsonian Institution in 1919

"These published results described expansion nozzles of eight-degree taper, electrical ignition by wires through these nozzles, and the system of using bundles of similar rockets; all of which are now in use abroad.

"A plane equipped with powder rockets, however, has an extremely limited cruising radius unless it is used as a rocket glider. If, on the contrary, liquid propellants, capable of supplying a large amount of energy, compared with an equal weight of powder, are used and the amount of propellant carried is large compared with the weight of the rocket plane itself, some very surprising distances can be covered in a much shorter time than with an ordinary plane. The development work on liquid propellant rockets planned abroad is unnecessary, as my work under the Smithsonian Institution has already produced liquid-propellant rockets that operate."

South African Plane Clubs Increasing

A NUMBER of light-plane clubs in South Africa are enthusiastically supported by private individuals, in spite of the fact that the airports there are very poor in comparison with those of the United States and Europe. In some instances these clubs, which are increasing in number, receive government assistance.

Pilots' licenses are given at all the clubs and while the instruction charge is very high $12 per hour—and other expenses are proportionately graded, the number of applicants for licenses is increasing

Young Flier Ends Amazing Trip

BARON VON WARTHAUSEN, a 23 year old German pilot, who, with only seventeen hours of flying experience, entered an air contest, won the cup, and proceeded to fly around the world, was in New York recently. In an interview he gave the amazing story of his flight.

Starting from Berlin with only three days' notice, the Baron, flying a light plane in reality only a glider equipped with a motor flew to Moscow in a non-stop dash, covering the 1,180 miles at approximately ninety miles an hour He had not intended to go any farther, but his sporting spirit led him to fly on to Persia, and from Persia, where he had several adventures, to India. At each stopping point he received messages to return home, which only made him more determined than ever to continue his flight. In India he spent two months hunting then he flew to Singapore, to Rangoon, Siam, to Indo-China and, finally, to Shanghai and to Japan, whence he sailed for the United States. The baron flew without goggles, and set his course by a pocket magnetic compass and a huge map of the world.

(Continued on page 660)

4 of the 40 Easy Ways

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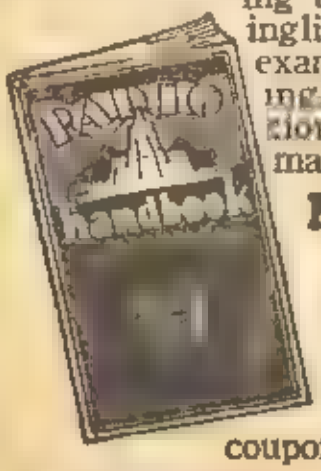

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$1,100.00 in 6 Weeks J. R. Allen, Calif. — "Have done over $1,100.00 worth of business in the last 6 weeks. Next month I am going to open up a store of my own. I never knew that money could come so fast and easy."

$25.00 a Week Spare Time N J Friedrich, N. Y.—"I have averaged $25 00 a week for the last 7 months even though I am not a graduate but just learning."

Training Lands Him Job R. C. Kirk, N. C.—"Your training has been very valuable to me. I landed a job with the big department store out here a few weeks ago because I had my membership card with me. There were a large bunch of applications ahead of me."

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AVIATION NEWS
GENERAL

(Continued from page 658)

Designers Approach "Fool-Proof" Planes

THE Guggenheim safety contest has taxed the inventive power of the world's leading aircraft designers, and it has drawn their attention to the problem of making planes "fool-proof," according to Lauren D. Lyman, writing in the *New York Times*. The nine airplanes entered in the safety contest display some radical departures from the conventional wing [illegible]n, which have been made to permit of [illegible]gs much slower than those practised at [illegible] time.

Among the planes is the Handley-Page biplane, an English craft with the famous Handley wing slots and with flaps on the trailing edge of both wings, which are connected with the slots and work automatically with them. The upper wing also carries a protuberance to disturb the air flow over the wing.

Other planes have features even more novel. The Curtiss *Tanager* also has slots and flaps, which are controlled by the pilot. Flaps are a feature of most of the entries. The Bur[illegible] entry has a v[illegible] and a [illegible] aspect [illegible] The [illegible] has the variable camber; and on this machine it is possible to bend the center section of a wing down 28 degrees, from its streamline position behind the leading edge.

Aviation New Basis for World Peace

DANIEL GUGGENHEIM, writing in the *New York Times*, predicts an expansion in world air service as yet unrealized, and indicates that international amity will be fostered [illegible] development. The evolving of an "export-minded" public is of the utmost importance in furthering both ends; for the reason that trade has always been the most powerful factor in bringing countries into closer relations, and because an economic basis of understanding is by far more effective than a diplomatic agreement.

Britain Withdraws from Schneider Races

BECAUSE of the great expense involved, the British government has decided to withdraw from future Schneider Cup events. English planes will be entered only by private individuals, financed by private companies.

The cost of the contest won recently by England exceeded $5,000,000, and the expense is too great to be continued, inasmuch as the Britons believe the superiority of English speed planes has been proved. The withdrawal of England from the event leaves Italy as the only nation participating with America.

Air Corps Students Must Serve

THE government will no longer train flyers without receiving service from them, says C. B. Allen, in the *New York World*. It has become the habit of p[illegible] to take the cream of the arm[illegible] [illegible] [illegible] [

THE READER AIRS HIS VIEWS

(Continued from page 654)

What Is An Automatic Revolver?

Editor, AIR WONDER STORIES:

In your October issue of AIR WONDER STORIES I noticed the story, "The Air Spy," by Edward Lee Harrison.

Now, I am no scientist—frankly, I only read your publications for the fiction interest—so I have no criticism to offer on the scientific side. But there is one thing the author mentions that happens to be right in my line.

In the story the author has Commander Holden of the *Petrel*, in preparing to board the *Pegasus*, arm himself with an *Automatic Revolver!*

Now, will Mr. Harrison kindly tell us, for the benefit of the lay readers, who are not scientists, just what sort of a gun that is?

I served five years in the army during the war and afterwards, and have been more or less familiar with small arms all my life; but for the past fifteen years I've been on the trail of that elusive "automatic revolver." I have never been able to find one yet, though I quite often find references to it in fiction written by fellows who don't even know which end of a gun the bullet comes out of. The last reference to one I saw was in a local paper, ex President Obregon of Mexico was supposed to have been shot by one. Now it bobs up again in your magazine. Maybe I'll catch up with it some day, but, so far, I've interviewed many arms experts and consulted catalogues of practically all the arms dealers. Not one seems to have ever seen or heard of one (except in the fiction stories mentioned).

Perhaps your author, Mr. Harrison, can clear this point up for me. For the information of any "scientists" I'd like to state the following facts regarding pistols. They may be classed, roughly, in three groups.

1. The *pistol* (single-shot) which is now obsolete.

2. The *revolver* in which the cartridges are carried in a cylinder which *revolves*—hence the name. The single-action, in which the hammer has to be cocked with the thumb before each shot, is preferred by old timers, but now becoming obsolete. The double-action, in which the gun is cocked and fired by a single pull on the trigger (the hammer may also be cocked with the thumb, as in a single-action) is now most in use.

3. The *Automatic Pistol* (*not* revolver), in which the cartridges are fed up to the chamber by a spring in the magazine clip. These clips are loaded and then inserted in the magazine which, in practically all makes, is in the butt, stock, or "handle" of the gun. *Nothing* about this gun *revolves*, and it is mechanically and scientifically impossible—or has been, so far—to combine the *revolving* and *automatic* features. Perhaps that's what Mr. Harrison meant—a gun of the future—but why couldn't he give us a short description of it?

JOSEPH D. COX,
New Orleans, La.

(We believe that Mr. Cox is right, that the average man uses the term "revolver" and "pistol" too loosely. In the story, "The Air Spy," we consider it possible that Mr. Harrison really meant only an "automatic pistol." However, it will be of interest to Mr. Cox to know that a true "automatic revolver" was produced some years ago, by a leading British manufacturer, in the Webley-Fosbery, a heavy weapon of military pattern. In it the barrel, cylinder and upper frame are slideable as a unit on the lower frame, and their travel under recoil operates the lock, causing the cylinder to turn after each shot. So the idea is far from "impossible."—*Editor.*)

Does Not Need Serials

Editor, AIR WONDER STORIES:

You have asked for votes of your readers concerning the running of serials. As for me, you may put me down with Mr. Kiessling, that a good magazine does not need serials and surely not yours.

It is more or less trouble to keep following a serial, as one loses track of it through reading many stories in between times. Other magazines have too many continued stories for me, consequently I have lost my interest in them.

LOUIS HELD,
4 E. Martanna Apts.,
Covington, Ky.

(Serials are an established feature of every fiction magazine. They have the peculiar virtue of allowing the periodicals to publish stories which are too long to be included in one issue. Moreover, several popular novels have appeared first as magazine serials, and when you read a serial you often acquire an advance knowledge of what is destined to be a book widely discussed.—*Editor.*)

(Continued on page 662)

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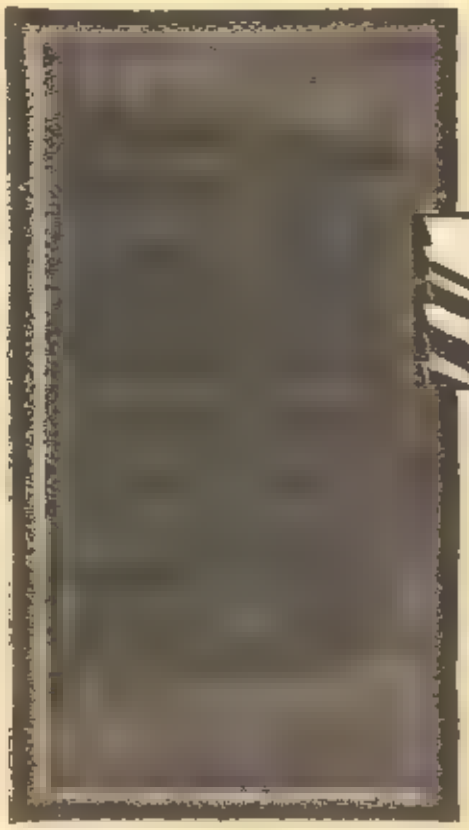

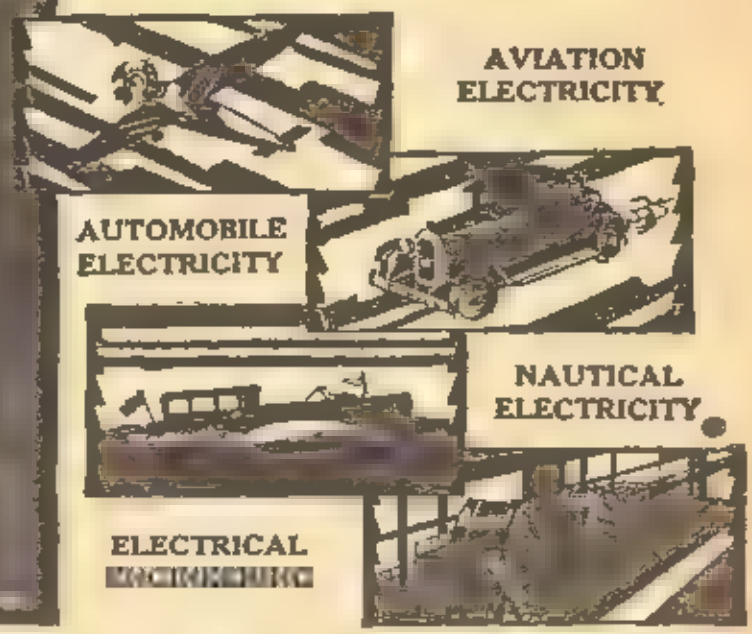

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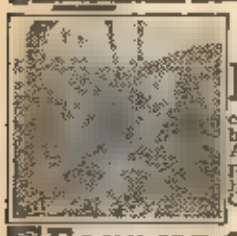

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THE READER AIRS HIS VIEWS

(Continued from page 661)

Wings Flat as a Board

Editor, AIR WONDER STORIES:

I like this magazine very much, but I am in favor of longer stories or serials. Of course you've got to have some short stories sometimes but not as often as you have them now. As to the AIR WONDER QUARTERLY you can count me a subscriber to it.

I would class the stories in the December issue as follows:

1st, "Cities in the Air", 2nd, "The Blue Demon", 3rd, "Freedom of the Skies", 4th "The Phantom of Galon", 5th, "The Flight of the Eastern Star", 6th and *worst*, "Flannel cake's Invention."

I think that the "Flight of the Eastern Star" calls for a sequel also "Freedom of the Skies."

In "The Phantom of Galon" I think that the occupants of the "Skyrocket" would be tumbled about a little bit, don't you? Also in "The Blue Demon" Nutter (who illustrated it) was kind of wrong in his conception of the white planes. He has the wings on the white planes flat as a board, which would not hold the plane up because there would be no vacuum formed on top to help support the weight. And why would he want the wings curved at the tips? That wouldn't help any. They are harder to conceive than the other airplane with the spikes on the front and top.

You wanted to know which magazine is the best. Well I think that there is not a particle of difference between the SCIENCE WONDER STORIES and the AIR WONDER STORIES.

ROBERT R. CLARKE, JR.,
Edinburg, Texas

(In our answer to Mr. Frechner we discuss the relative merits of serials and short stories. This is, of course, an open question, and the more correspondence we receive on the point, the better will we be able to judge our material for future issues. Mr. Clarke's suggestions for sequels reflect the opinions of other readers. Perhaps we can persuade the authors to write the stories desired.

Perhaps you are right about "The Phantom of Galon." The occupants *would* be shaken up a little. As to the illustration by Nutter, we must remind Mr. Clarke that we wished to convey the pure whiteness of the wings rather than their curvature. The curved tips are quite useful. In our news section, you will find that many of the Guggenheim contestants have curved wing tips that bend down. These make for slow landings.—*Editor.*)

Burroughs Best Imaginative Writer

Editor, AIR WONDER STORIES:

All I want to say is this: Why don't you get a good air wonder story by Edgar Rice Burroughs? In my opinion he is the best imaginative writer of the day. I really do think he could write a better AIR WONDER story than any author you have now. Just one more thing. Why not have a scientific cross-word puzzle in your SCIENCE WONDER STORIES? I think many other readers would want this. I have read AIR and SCIENCE WONDER STORIES from the first issue, and I'm just sitting down to read the QUARTERLY. I would like to see the same kind of stories as Edward Sheinberg wants.

LEO NEEDHAM,
165 West 80th Street,
New York, N. Y.

(Mr. Needham's idea is a good one. Burroughs has written very successfully of life on Mars. However, he has not, to our knowledge done anything about space flying machines.

Regarding the scientific cross-word puzzle, we are starting in SCIENCE WONDER STORIES a new department which is to be announced in the next issue which will be quite thrilling. Watch for it!—*Editor.*)

Wants Love Interest

Editor AIR WONDER STORIES

I thought that I would write to you and give my opinion of the various subjects which have appeared in 'The Reader Airs His Views'.

About the subject of serials. I am in favor of serials. Publish one and when that is finished start the next one in the next issue. As for length, that depends entirely on the length of the story. If a story is good enough it should be published whether it takes two or six, or even more issues. You should not make the instalments either too long or too short, about the length of those used with "Cities of the Air," which by the way was an excellent story.

I am in favor of Interplanetary *and* interstellar stories. True, they may not fall under the title of AIR WONDER STORIES, but to exclude them on that ground would be quibbling. As you mentioned they are in a way the future of aviation, and therefore would come under the scope of this magazine. Besides I am sure

(Continued on page 663)

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THE READER AIRS HIS VIEWS

(Continued from page 662)

that the majority of your readers like them. Maybe you could publish a QUARTERLY containing interplanetary and interstellar stories instead of an AIR WONDER QUARTERLY.

I have noted with alarm that you seem favorable to several propositions of a non-fiction nature which have been suggested. Remember that your magazine is primarily a fiction magazine. You are publishing enough non fiction now and any more would deprive the readers of space which, I think, could be better used for stories.

I don't know which I like best of your two magazines. When you first started AIR WONDER STORIES I thought that it could not possibly be as good as SCIENCE WONDER STORIES, due to the more limited scope of the former. However you seem to pick out such good stories for AIR WONDER STORIES that it is almost if not quite as good as SCIENCE WONDER STORIES. Keep up the good work.

I think the ideal makeup of your magazine would be as follows: Publish one installment of a serial, two or three long short-stories, and one or two short short-stories in each issue, besides your non-fiction departments which you have now. A good example of a long short-story is "The Yellow Air Peril" and "The Planet's Air Master." Good examples of a short short-story are, "Flight in 1999" and "Suitcase Armanes."

I vote for a mild love element. It helps give human-interest to the story—something which is very apt to be lacking in science stories, especially short ones.

JACK P. SICKELS,
Lapwai, Idaho.

(Mr. Sickels agrees with many of our readers. Two-part stories and serials are much in demand. Concerning the love interest, opinions differ. Many of our readers want this element excluded for the reason that it does not belong in science fiction. However, a mild love story helps the development of a plot and adds interest to the story as a whole. We see no reason why it should not be allowed to remain. As we have mentioned in our last issue, stories that deal with the future of aviation even though they be interplanetary will be printed in AIR WONDER STORIES. Such a story is "The Death's Head Meteor" by Neil R. Jones in this issue.—*Editor*.)

IF you have not as yet seen the WINTER SCIENCE WONDER QUARTERLY

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"Into the 28th Century," by Lilith Lorraine
"Underground Waters," by A. C. Webb, M.D.

Do not miss the Winter issue on all newsstands December 15

A Prophetic Vision

Editor, AIR WONDER STORIES:

John R. Kiessling raises an interesting point, and personally, I too, dislike continued stories. Interest lags. I save my copies and read the story when it is complete. If we must have continued stories, I should say one each month would be enough. I would suggest letting the monthly magazines take care of the short stories and let the novel-length ones be handled in the quarterlies. In the latest quarterly you have two long and two short stories.

Now for a word of commendation: all the stories are good; some, of course, are better than others; but, "The Ark of the Covenant" is much more than a good story. It is a prophetic vision that every government on earth should heed. Mossbackism is a disease that is afflicting the ruling majorities of nearly all our legislatures. Governments just simply refuse to keep pace with progress; they are asleep on the job, and need a good stiff jolt under the chin to awaken them.

(Continued on page 665)

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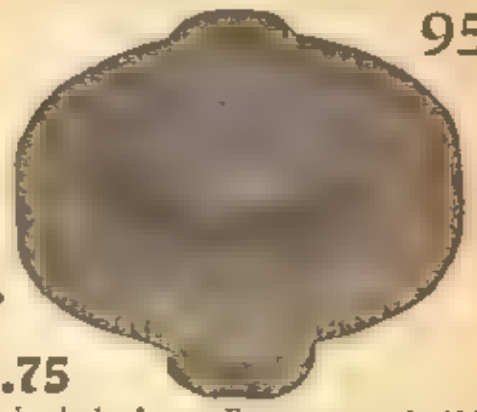

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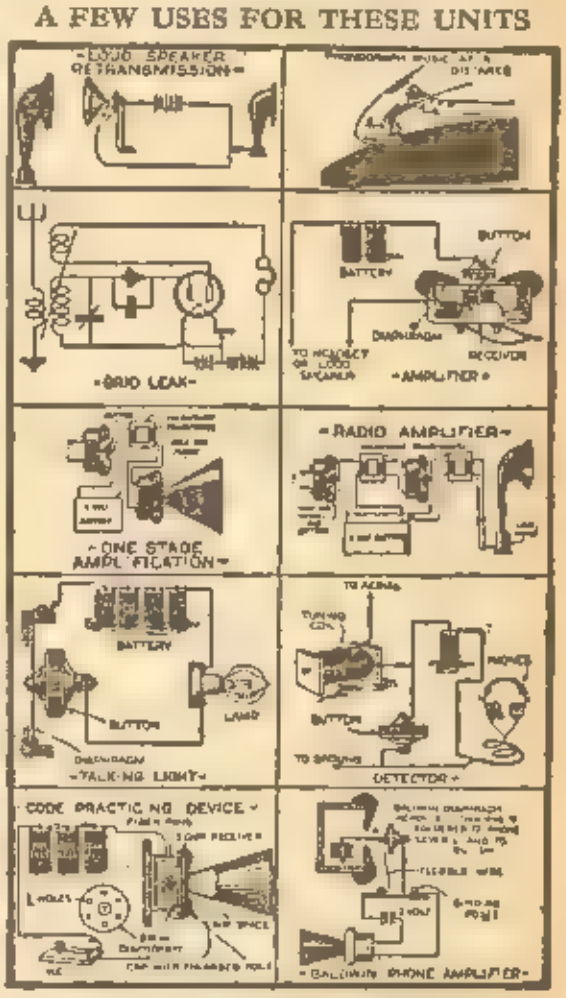

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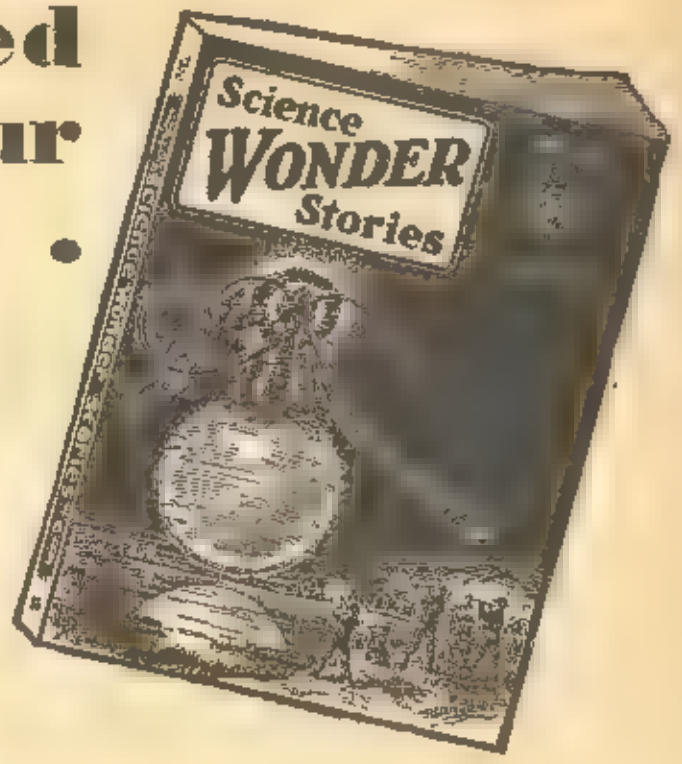
What a different World we might Live in . . . .



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If a super-intelligence would pour its knowledge into our brains, what a different world we might be able to construct for ourselves!

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THE READER AIRS HIS VIEWS

(Continued from page 663)

The science used in the "Ark" may be in advance of our time, but the dirigible we have today could, without notice, flood with deadly lethal gas, like Lewisite, any congressional chamber in the world today. Reading this story might make the legislator realize it. I should like very much to see this story printed in book form and a copy of it placed in the hands of every legislator and reactionary and reformer in the world.

ERNEST H. [illegible]
[illegible] New York

We agree with Mr. [illegible] be put into the hands of the [illegible] into the [illegible] what we must [illegible] them if [illegible] *Editor.*)

Doesn't Like War Fiction

Editor, AIR WONDER STORIES:

[illegible] criticism of [illegible] Why is it necessary [illegible] the editor [illegible] is slaughtered. [illegible] cations for some [illegible] but the stories of [illegible] very [illegible] of stories of [illegible]

OOBE,
235 Pacific Ave.,
San Francisco, Cal.

(We are much interested in this complaint about war stories. It must be remembered, however, that descriptions of war in the [illegible] allow the authors to invent new and wonderful aerial machines. But as this is a question on which opinion is divided, we shall welcome the comments of readers, pro and con, on war fiction.—*Editor.*)

Have We Any Imitators?

[illegible] others—imitators.

I am writing now for two main reasons: First, to enclose the coupon for my copy of "Between Worlds," and second, to add an emphatic "Yes" to your question about an AIR WONDER QUARTERLY. But why not make it a bi-monthly? You can be sure that every one of your readers would find themselves unable to pass it up, even if they wished to. And every reader is a booster. I myself have secured at least four new readers. (I like to [illegible] I will try to answer some [illegible] his covers attracted me first, and [illegible] Long stories and serials are much the best. I am always disappointed when I see too many titles listed in your too small magazine (thin, I mean.) Serials provide the anticipation which is the spice of life.

The illustrations inside are adequate. Any more would take away space from reading matter. As to which magazine is the best: To me, neither; each in its field suits me fine.

A reader asks you to omit [illegible] and Romance from the magazine. [illegible] taking the soul from the body! We don't want *articles*, we want *stories*.

My preference is for Interplanetary and Futuristic stories. I make no attempt to list, grade, or classify your selections. I like them all. The best one printed, to my mind, was the "Skylark of Space." A splendid place for a sequel to that—do we get it?

Your first QUARTERLY was *fine*. But it's so long to wait for another! You can be sure of a steady reader.

W. S. FITZGERALD,
211 West 122nd Street,
New York City.

(Mr. Fitzgerald overwhelms us with praise. Even if he hadn't told us so, we would have known he is a man who likes to see others enjoy themselves. As we must remain impartial, we cannot undertake to decide between our two monthly magazines, but his praise of both echoes the sentiments of a great many of our steady readers.

The AIR WONDER QUARTERLY is now under consideration.—*Editor.*)

The Hero Always Escapes

Editor, AIR WONDER STORIES:

I have been reading AIR WONDER STORIES for quite a while and think that as a whole the magazine is very good. The story which I like best in the AIR WONDER STORIES is "The Ark of The [illegible] I also like [illegible] always the hero escapes; he is [illegible] prisoned; he then escapes with the [illegible] tion which is necessary to save his [illegible] or world, or he sacrifices his own life and destroys the machine which will endanger his world. Because of this I usually know his story before it is published. Please do not publish any more of his stories. I would like to see an AIR WONDER QUARTERLY issued. Kindly notify me if you are going to issue one.

720 R[illegible]

(In most of the [illegible] Jacoby gives [illegible] The merits [illegible] interesting [illegible] his critics. We shall be glad to hear the opinions of others in regard to him.—*Editor.*)

Another Request for Burroughs

Editor, AIR WONDER STORIES:

The requisition of authors like Edgar Rice Burroughs, Stanton A. Coblentz, Ray Cummings, A. Hyatt Verrill and A. Merritt to the ranks [illegible] the latest edition was [illegible] in the Air" by Edmond Hamilton. Stories of insect peril are also very instructive and entertaining. How about an AIR WONDER ANNUAL or QUARTERLY? I'm sure that the readers will want it.

JULIUS UNGER,
786 Blake Avenue,
Brooklyn, N. Y.

(Several readers have already asked for contributions from the authors mentioned. We must warn our readers however that it takes time to comply with their requests. Stories must be thought out and carefully written. But we expect to have some good news in the near future. In the meantime we have a very unusual story "The Flying Legion" by George Allan England which begins in this issue.

So many people have asked for an AIR WONDER QUARTERLY that we are seriously considering one at the present time.—*Editor.*)

Appreciation from a Young Critic

Editor, AIR WONDER STORIES:

I have just finished reading the December *Science Wonder Stories* and part of December AIR WONDER STORIES. I would like to see a sequel to "The Lost Martian" and also to "The Second Shell" which was in November [illegible]

Watson Ruch might as well not read the magazine. The way some of these readers run down the magazine, I wonder why they read it at all.

[illegible] stories I [illegible] like [illegible] of [illegible] Were [illegible] the [illegible] and [illegible] of the Chinese [illegible]

It seems to me that a lot of people are clamoring for an AIR WONDER QUARTERLY and for a story by Edgar Rice Burroughs.

I would like to [illegible] The [illegible] he is referring to is "The Shot [illegible] I liked it better than "The Shot [illegible]

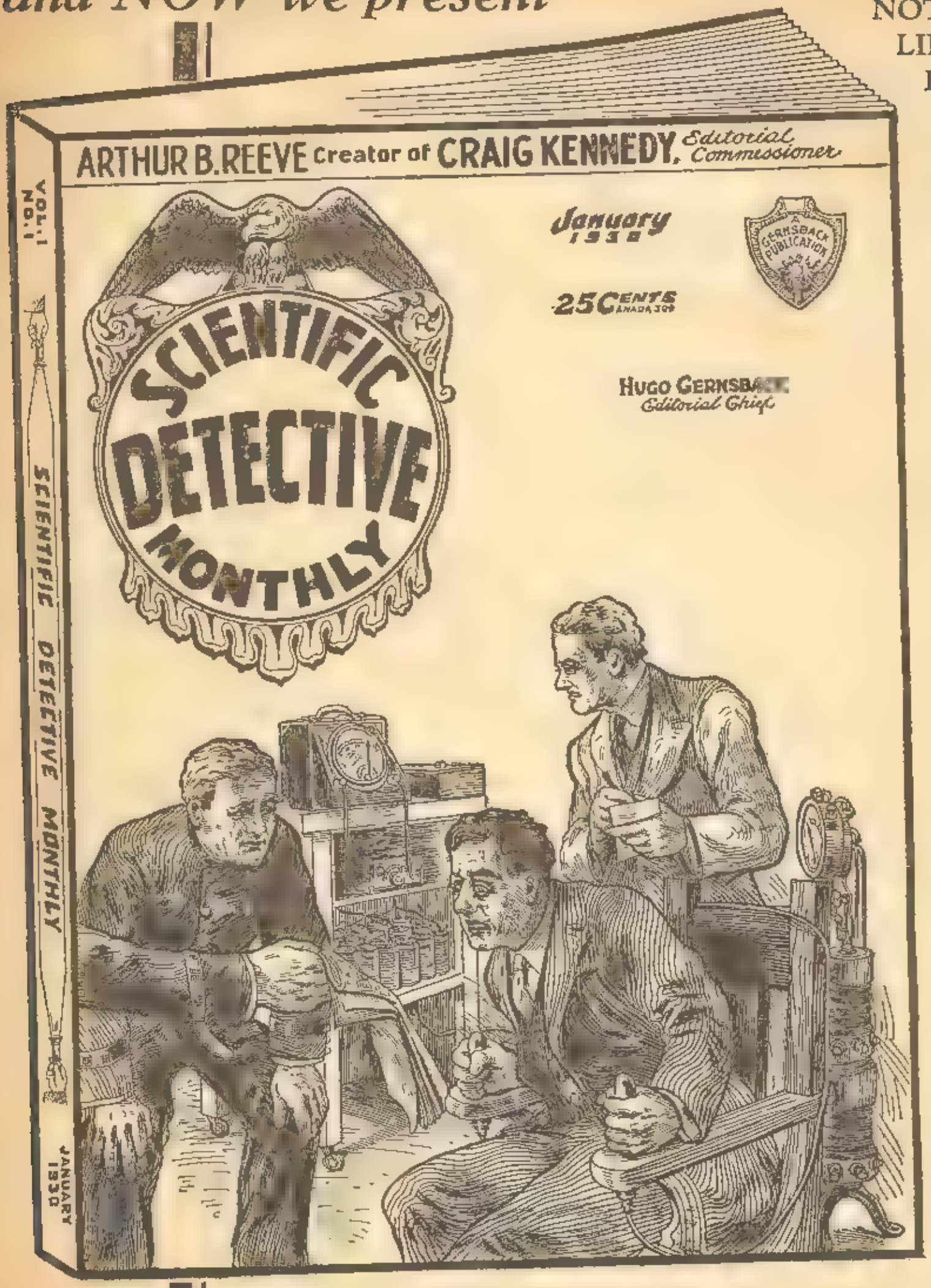
[illegible] to the Radium [illegible] Chinese [illegible] [illegible] it was [illegible] As I am [illegible] [illegible] children should [illegible]

I hope for an [illegible] QUARTERLY [illegible]

Los Angeles, Cal.

(We receive many [illegible] from young people. [illegible] [illegible] [illegible]

and NOW we present



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Turn to page 666 of this issue and read the interesting announcement of the new SCIENTIFIC DETECTIVE MONTHLY.

THE READER AIRS HIS VIEWS

(*Continued from page 665*)

In Defense of Mr. Repp

Editor, AIR WONDER STORIES:

It was with resentment that I read Mr Courtney R. Draper's very unnecessary letter in the November issue criticising "Beyond Gravity," by Ed Earl Repp, your most talented and gifted author.

Mr. Draper must be a very personal friend of Victor MacClure when he asks that only MacClure's stories and your special column be published. Why does he think that love affairs do not pop up over night? Why does he think the love sequence in "Beyond Gravity" was impossible? As far as reading stories of "B. G.'s" calibre written by grade children—that statment displays utter ignorance.

I am not a friend of the author. I never met him nor have any desire to, but I must rise in his defense against Mr Draper's unjust testimony. I think "Beyond Gravity" was one of the best stories you have ever published. I admit that Mr. Draper's 'friend' MacClure is good, but he hasn't the the talent nor wide scope of versatilty that is characteristic of Repp. Any one of Repp's stories is more interesting, more thrilling and more plausible than "Ark of the Covenant." So I think that Mr. Draper wanted to kick about something and could find no excuse in AIR WONDER. He merely placed a finger on "Beyond Gravity," like picking a card abstracteuy from a deck. "Beyond Gravity" was one of the best stories I have ever read and I congratulate you on the defense you made for the author. Perhaps Mr. Draper does not know that Victorianism has collapsed.

BUD ALLEN,
Grand Hotel,
San Francisco, Cal.

(We are glad to print Mr. Allen's letter in defense of Ed. Earl Repp. We invite letters pro and con on this subject.—*Editor.*)

IF you enjoy AIR WONDER STORIES you must read SCIENCE WONDER STORIES, its sister magazine. In SCIENCE WONDER STORIES you will find all of the good authors who write for AIR WONDER STORIES, and there are many stories that deal with aviation and, particularly, space flying and interplanetarian trips. Be sure to get the January issue now on all newsstands. Table of contents follows:

"The Conquerors," by Dr. D. H. Keller

"The Red Dimension," by Ed Earl Repp

"The Vapor Intelligence," by Jack Barnette

"The Fitzgerald Contraction," by Dr. Miles J. Breuer

Future Aviation Now Lures People

Editor, AIR WONDER STORIES:

I feel I must write to you, to let you know my opinion of AIR WONDER STORIES. After having read five numbers of the magazine, I feel that it stands at the head of all air fiction magazines. It does more than stand at the head—it is the leader, pioneering in a new angle of aviation.

Ordinary air fiction, in my opinion, has lost [illegible] in the public mind. It has been supplanted by science-aviation fiction. The mechanics of future aviation now lures people. Every day more and more people become interested in the future of aviation, rather than in the old-time air stories.

"The future of aviation springs from the imagination" is a most appropriate motto for your magazine. Some one must pioneer in a new science. The great pioneer of aviation was Jules Verne. Such stories as his "Robur the Conqueror" have aroused public interest in an industry with an enormous future. Who can tell what the future of aviation will be? Inventions or theories ridiculed to-day may become obsolete in the next century.

Coming back to the point, your magazine is a wonder. One of the most amazing stories is "Cities in the Air" by Edmond Hamilton. All of Hamilton's stories show great application of

(*Continued on page 669*)

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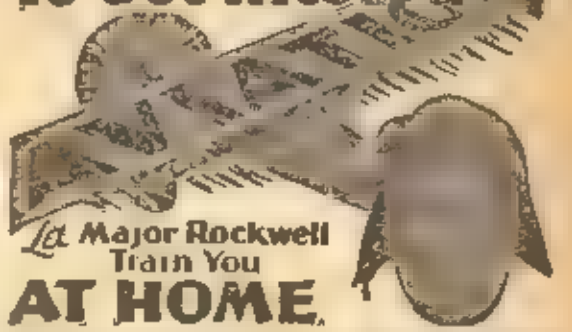

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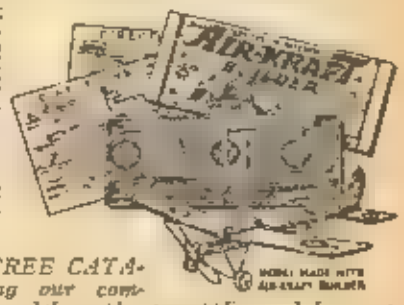

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A MESSAGE TO ALL LOVERS OF SCIENCE FICTION

There is a big treat in store for you. Be sure to turn to page 657 as well as page 666 of this issue.

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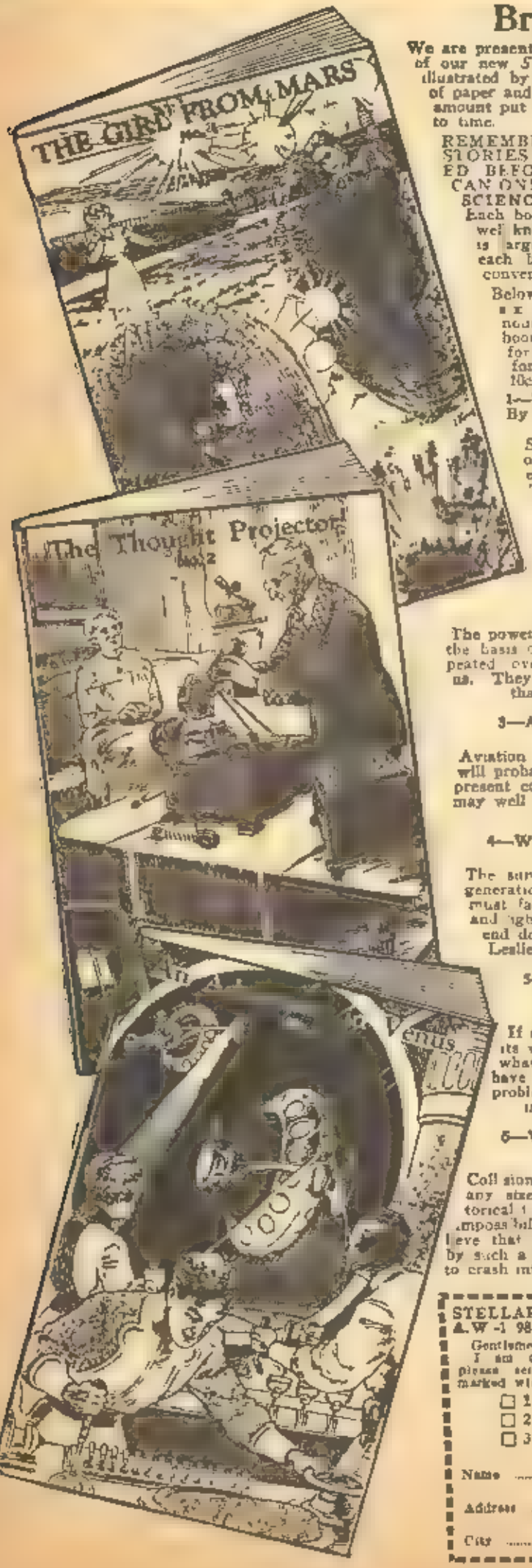

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5—THE BRAIN OF THE PLANET
By Lilith Lorraine

If a super-intelligence could have its wisdom poured into our brains, what a different world we might have. Miss Lorraine poses such a problem and works out the answer in an astounding manner.

6—WHEN THE MOON FELL
By Charles H. Colladay

Collisions between celestial bodies of any size have not occurred within historical times. But such an event is not an impossibility. In fact many astronomers believe that our solar system came into being by such a collision. Suppose the moon were to crash into the earth. What would happen?

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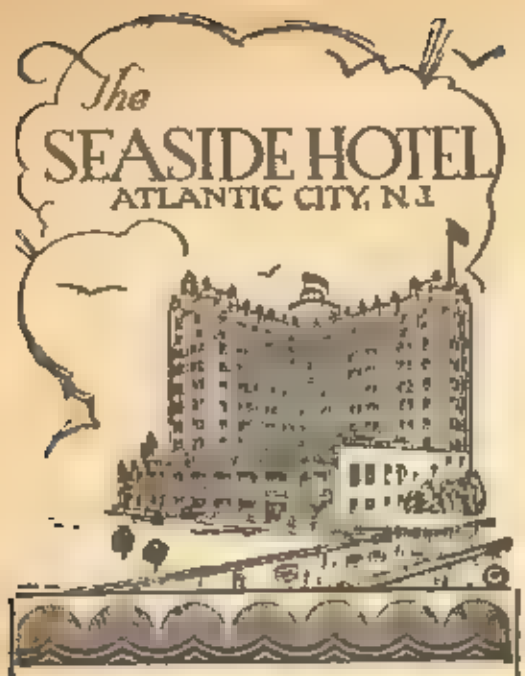

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AIR WONDER STORIES
98 PARK PLACE NEW YORK

THE READER AIRS HIS VIEWS

(Continued from page 667)

imagination and science. Who knows, but that the cities described by Mr Hamilton in his wonderful story, may not become commonplace in the next century?

The, one story that I did not enjoy was "The Ark of the Covenant." To me, there was not enough science in it. A story lacking in scientific detail doesn't hold my attention.

I rate the stories in your latest issue (November) as follows:

1 "Cities in the Air"—E. Hamilton.
2 "When Space Was Opened"—R. Wilkins.
3 "The Second Sight of ..." Williamson.
4 "... the ..." E. ... kepp.
5 "... Crystal ..." R. ...
6. "... Menace ..." E. D. Skinner.

Your ... should be rated ...
1—...
2—...
3—Readers' Views

I must not fail to compliment Paul for his wonderful illustrations. I place Paul in a class with the masters. His pictures should certainly be placed in the Metropolitan Museum of Art.

ED ANDERSON,
New York, N. Y.

(We were asked to put out a regular aviation magazine—but we refused, because there is not enough real material possible for one. Any magazine can print a story of a murder or a courtship or a marriage taking place in the air. The only thing necessary is to transfer the locale of the story from the ground or from an automobile to an airplane. We specialize in stories which are out of the ordinary, and which would have no place in other magazines. Our material, dealing with the future, abhors the commonplace. —*Editor.*)

Wants Interplanetary Stories

Editor, AIR WONDER STORIES

C. W. Sibley made a very good suggestion when he suggested "Interplanetary" stories. The "Silent Destroyer" and the "Sky Maniac" by Henrik Dahl juve are both very good. Why not more? I think that AIR WONDER STORIES is the best magazine printed, but it is closely followed by SCIENCE WONDER STORIES.

Stories of the near future are interesting because we may see some of the stories come true. Both books are good but there is one month between each serial installment. I see that your QUARTERLY is as interesting as AIR WONDER STORIES and SCIENCE WONDER STORIES.

WILLIAM PYE,
Plainfield, Conn

(As Mr. Pye will observe from this issue, AIR WONDER STORIES extends its scope into outer space. "The Death's Head Meteor" is a future aviation story, but it is not confined to our own little planet. In the future where a story deals with future aviation and deals also with other planets we will not hesitate to use it in AIR WONDER STORIES.—*Editor.*)

Likes Serials

Editor, AIR WONDER STORIES

There seems to be quite a discussion over Mr Kessling's knocks about your magazine. He upholds the short stories and fights the serials to the bitter end. Serials should be in every magazine. If he doesn't like the serials why does he buy the magazine? He is a bit too severe in his remarks. I for one hate short stories, though there should be at least two short stories in every issue of your magazine.

Mr Editor—you ask which of the following two are the better, AIR WONDER STORIES, or SCIENCE WONDER STORIES. I must say that SCIENCE WONDER STORIES is a little ahead of ... though ... I also ... to some readers who wish to have some stories that they have read printed for the benefit of others. Ray Cummings is a master of Science Literature; if you could print some of his stories in your SCIENCE WONDER STORIES magazine such as "The Girl in the Golden Atom" or the "Snow Girl" and most of all "The Princess of the Atom," I'm sure your readers would appreciate it. I hope you will favor me with a reply in your editorial to this. And say—what about THE AIR WONDER QUARTERLY that has been promised us in the *near future?*

A. FROEHNER,
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(It is obvious that tastes vary. Some of our readers want serials, as does Mr. Froehner, and some want short stories only. However, we are glad to note that Mr. Froehner is broad-minded enough to realize the necessity for both. As to the reprints of science fiction, we are filling the great demand for those in our series of "Science Fiction Classics" the first of which, "Between Worlds" by Garret Smith will be ready in the very near future. AIR WONDER QUARTERLY is also under consideration.—*Editor.*)

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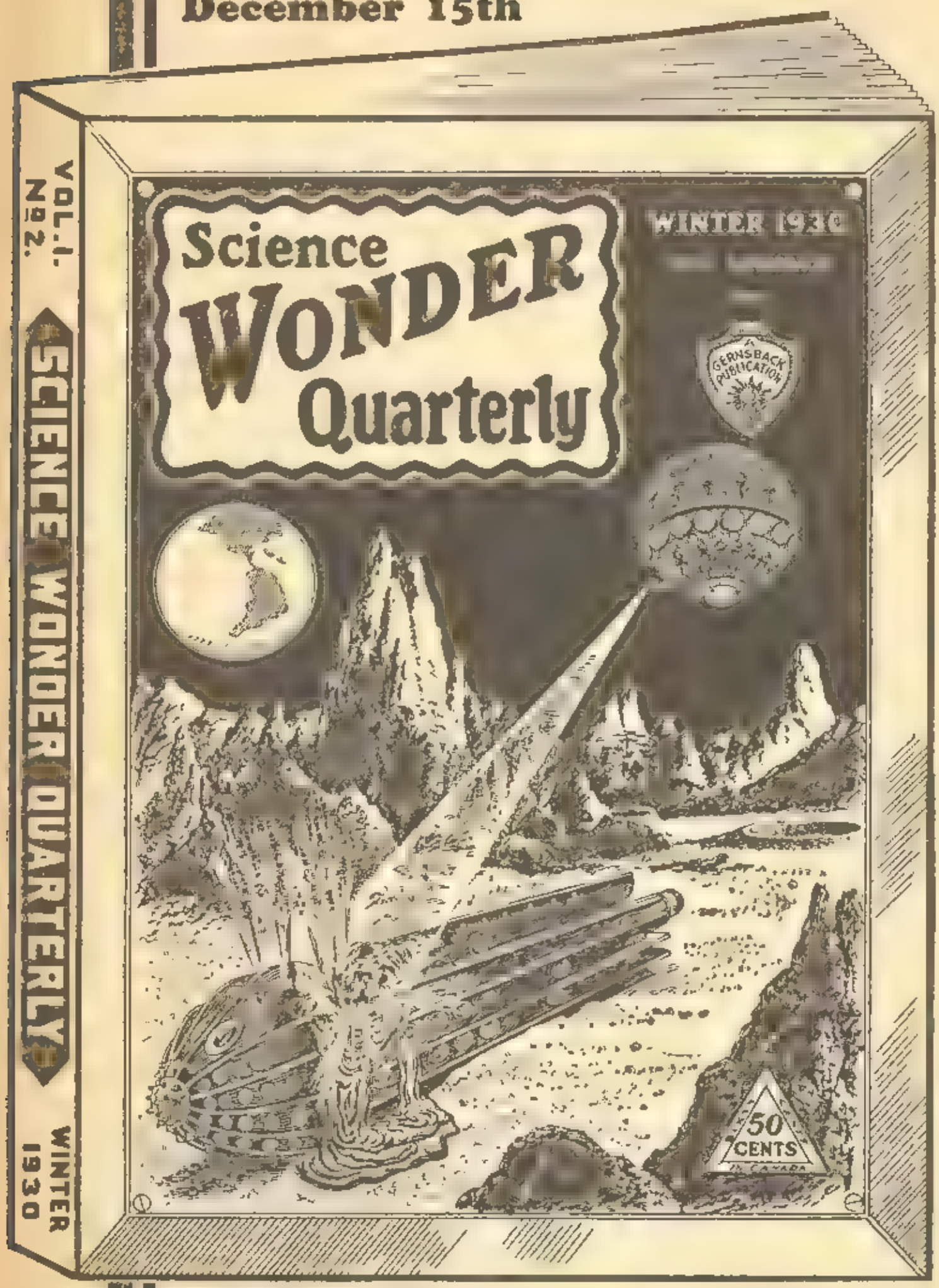

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BOOK REVIEWS

HOW TO BUILD AND FLY GLIDERS. 96 pages, stiff paper covers, illustrated, size 9 by 12. Published by the Popular Book Corporation. Price, 50c.

This highly informative book, to which a number of authorities have contributed, is the first, as well as the only, real compilation of all the available material on gliders. The various topics connected with the construction and operation of gliders, grouped in such a manner as to make the text easy of assimilation, cover every phase of a means of flying which is certain to take its place as one of the most popular sports of the future.

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One of the important features of the book lies in the number of illustrations. Each page has its pictures—photographs and diagrams—and some have a great many. These diagrams are especially numerous in the technical chapters. Nothing is left to chance; every point is illustrated as fully as possible. In addition, there is a table of weights and strengths (of woods, metals, and appliances) which is useful to all airmen.

How to Build and Fly Gliders is a valuable contribution to aeronautical knowledge. Representing, as it does, the cream of the world's glider experts, it is certain to be a standard text in a phase of flying which will unquestionably be extremely popular in the near future.

AVIATION FROM THE GROUND UP, by Lieutenant G. B. Manly, U. S. Army Air Service Res. 373 pages, profusely illustrated, stiff cloth covers, size 5½ by 8. Published by Frederick J. Drake & Co., Chicago.

Lieutenant Manly presents, in plain, understandable language, a practical instruction and reference work on aviation and its allied subjects. The volume includes the theory of flight, the details of airplane construction, airplane engines, rigging, instruments, and weather forecasting. In addition, there is a section on how to learn to fly, on aerial navigation, on stunt flying, and on parachute drops. The air commerce regulations and a dictionary of aviation words and terms add much to the practical utility of the work.

Aviation From the Ground Up was written, not for the technical expert or the aeronautical engineer, but for the layman who has an intelligent interest in flying, and who desires to learn to fly. Lieutenant Manly was an aviator before the World War; he served during that conflict, and he is still an active aviator. He presents to the reader the result of many years of intense application to his specialty, and in a manner which makes his book most useful. Realizing the disadvantages under which he labored during his own training days, he has produced a practical volume which has for its principal objective the filling of the requirements of the average learner.

Of unusual interest is the history of flying, which, coupled with the chapter on the theory of flying and aerodynamics, gives the reader a clear comprehension of how flight, in theory and in practice, has developed through the years in which man began to look up to the air as a new medium to be conquered.

In the technical chapters—which cover every phase of airplane material and construction, and parachute construction and operation—the author gives an unusually clear description of everything necessary for the aviator to know. Innumerable diagrams and photographs illustrate fully each topic in the text which is capable of illustration.

Flying cannot, of course, be learned through any system of instruction which does not include actual flight with an instructor. This book is, therefore, not intended to teach one to fly by himself. It does present, however, a veritable mine of information useful to the beginner and to the experienced flyer. As a reference work, and one which is to be consulted constantly, it belongs among the indispensable books of every aviation enthusiast and every aviator.

THE RED NAPOLEON, by Floyd Gibbons. 475 pages, stiff cloth covers; illustrated; 5 by 7¾. Published by Jonathan Cape & Harrison Smith, New York. Price, $2.50.

This thrilling volume by Floyd Gibbons, one of the greatest war correspondents America has ever produced, is a story of the future—and should interest everyone who wonders what future wars will be like. Taking as his theme the increasing aggressiveness of the Mongolian peoples, Gibbons develops an epic character—Karakhan of Kazan—who surpasses in military genius the great Napoleon, in emulation of whom he has been called "The Red Napoleon."

A good part of the story—which is filled with adventure and with prophecy—takes place in the air. Speed, the nominal hero of the tale, is a friend of the author, who tells the story in the first person. He is an airman, like the author himself; who, throughout the volume, retains his own identity as a newspaper correspondent for the *Chicago Tribune*.

The description of the battles fought in the air, and of the invasions of various countries by air, constitute the most interesting portions of the volume.

Where the value of the aviation details lies is in the fact that the action takes place as early as 1932, when Alfred E. Smith is president of the United States. The Yellow hordes, led by Karakhan, are imbued with the idea that supremacy of the white races must end. Their war-cry is "Conquer and Breed" and, to this end, they sweep across Europe, conquering every white nation, and intermarrying with the white women. For us the interest lies, of course, in the yellow invasion of the United States, by means of air attacks from the direction of Canada and Mexico. The radio communication reporting the attack on New York will give some idea of the scope of the aerial activity.

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Of course, Karakhan is beaten. Gibbons could not allow the United States to fall. The book, while it may stir up racial prejudice, fills the important function of opening the eyes of the people to what aviation may be in a few years from now. We can heartily recommend it to all our readers.

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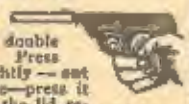

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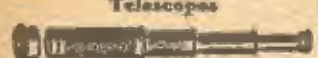

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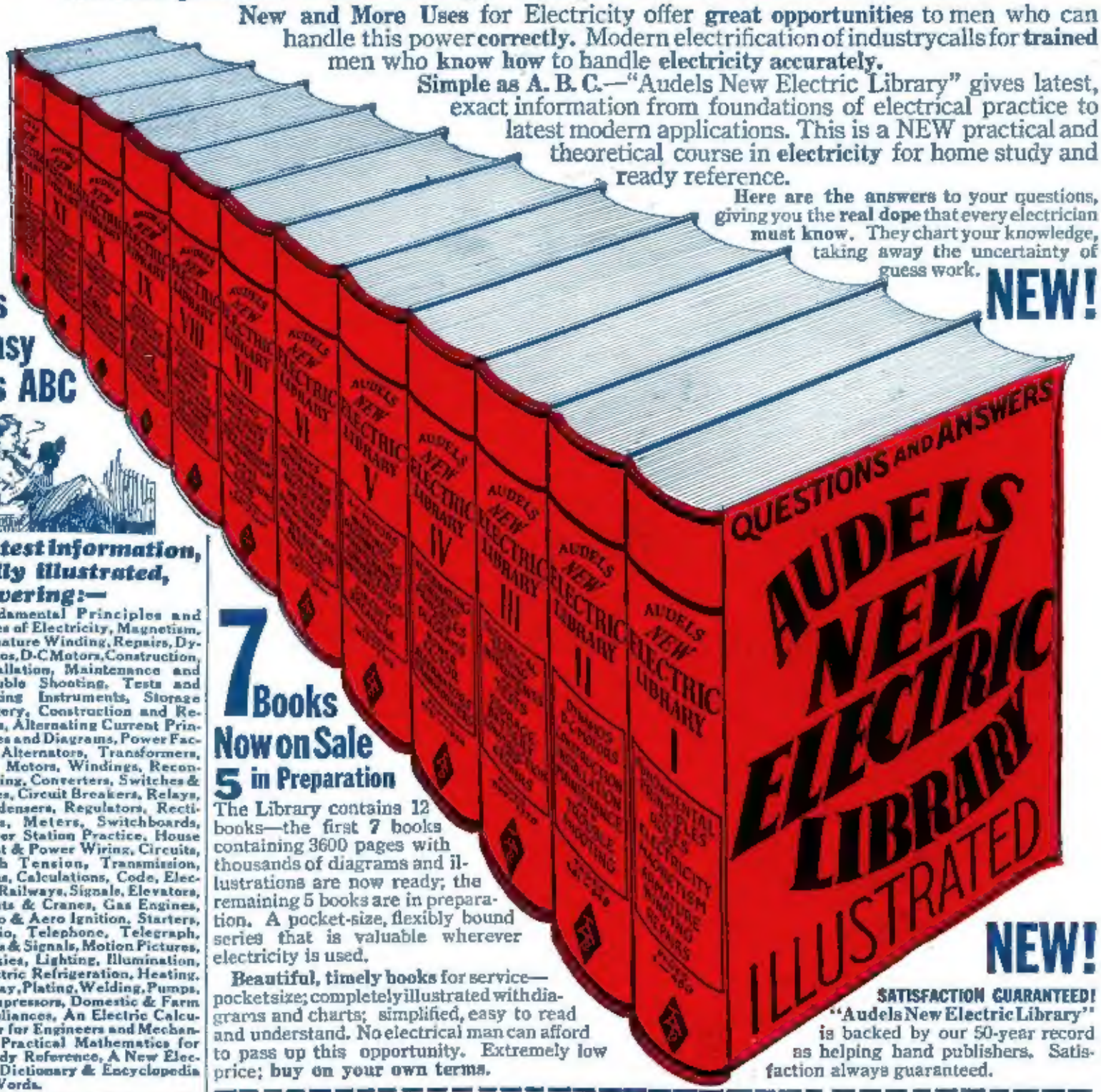

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